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'Mystery Hole' Strikes Again in Detroit Vote

By Thomas J. Morton

CHICAGO REPORT

DETROIT With the recent history of the punched card primary still fresh in the minds of politicians and concerned citizens alike, Detroit tried another computerized election and again the final count appeared hopelessly delayed.

Again a "mystery hole" is hobbling both the politician and the programmer and the charges and the countercharges are flying. And Detroiters are wondering what their city is trying to do to them.

Hinging on the outcome was a hotly contested gubernatorial race.

But this time, according to most opinions, certification of the vote seems highly improbable.

By midnight of election day, four hours after the polls had closed, only four of Detroit's 1,111 precincts had been tabulated. By 1 p.m. of the next day, only 200 precincts had been counted and it was 48 hours before Detroit had the final tabulation of votes completed.

In the primary, unexplained punches in test decks produced an overcount of exactly 1,111 extra votes, one for each precinct. The official explanation was that a card reproducing machine had made an extra hole in one card in a test deck and the final results were five out of six

test decks in error [CW, Sept. 16].

This time the "mystery hole" is a punch in the vote cards themselves at about M20 position in the ballot configuration.

In initial observation Los Angeles County seemed to have solved its previous vote count problems, but Flint, Mich., had a tough time with the weather. Stories on Page 4.

The card-to-spot program is designed to reject a card with a hole in that space because the demonstration punched cards have a hole there and the program is geared to extract any demonstration cards inadvertently.

tenly added to the ballots.

Now, according to reports, legitimate ballots with a punch at that configuration were being rejected. The rejection necessitates reproducing the card without reproducing the punch (approximately at column 3, row 9) and running the card again.

"It seemed," said an accuracy board member at one of the three counting centers, "that every other card had the rejection punch."

City Clerk George Edwards is claiming that the voters sabotaged the election by manually removing the chad from their ballots after removing them from the Votomatic machines.

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The XDS Sigma 9 uses a Teletype 35 KSR-based 7012 to communicate with the operator of the system. A 7017, based on the 35 ASR, is used to monitor the time-sharing software. In the background is the system's CPU, and to the left are two 7441 1,190 line/min printers.

XDS Sigma 9 Handles Varied I/O Job Mix

By Frank Prata

CHICAGO REPORT

11. SEGUNDO, Calif. The new Sigma 9, the largest system yet from XDS, is designed for both on-line commercial and scientific applications.

The Sigma 9 continues the trend toward commercial user special XDS initiated in the Sigma 6.

With up to 2-million bytes of memory on-line and a cycle time of 900 nanosecond-byte word, the new system will give the prospective user of the IBM 370/155 size another system to consider. Based on internal speed and system configuration, the XDS machine could be up to two and one-half times as fast as the 155 in performing jobs in a stream of scientific problems.

Commercial Mix

As the percentage of commercial work in a job mix gets larger, the advantage held by the Sigma would deteriorate until a totally commercial mix is encountered. In this situation, the Sigma's performance would be somewhat less than that of the 155.

Offsetting this would be the flexibility in the 9's configuration. Multiple central processors, up to four, and independent I/O processors would make possible a degree of simultaneity that

would be very difficult to achieve in the 370/155, enhancing throughput.

The Sigma 9 is organized around a high-speed CPU and as many as 11 I/O processors (IOPs) controlling I/O devices. Up to 12 access ports to memory can handle either multiple IOPs or CPUs, providing multi-

(Continued on Page 2)

By Edward J. Bride
CW Staff Writer

HOUSTON Despite an economic pinch which has reduced both travel and exhibit budgets, next week's Fall Joint Computer Conference is expected to be the largest exhibit in the history of computers and directly related equipment.

Preregistrations closed last week, and approached the record of 2,000, giving conference sponsors late cause for "optimism," despite the recent cancellations of several exhibitors.

The conference will take place in the Astrohall, adjacent to the Astrodome.

The preregistration total is not especially startling, since it is still less than 10% of the generally estimated attendance predictions for the three-day affair

Nov. 17-19.

The American Federation of Information Processing Societies (AFIPS), sponsor of the semi-annual event, had been using planning figures of 30,000 attendees. Past estimates and the economic atmosphere considered, AFIPS officials have re-

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vised their thinking to around 20,000.

Other observers are more optimistic, and point to the growing Southwest market and Houston's proximity to the Detroit-Chicago megalopolis as possible incentives for increased

"local" participation.

Exhibition Dropouts

The mood of the exhibitors is not so positive. About 10% have cancelled their participation plans, citing economic causes as prime reasons.

Several stated they could not expect to make enough sales to justify the expenditures for the exhibit, since they, the exhibitors, were predicting decreased attendance.

Latest figures from AFIPS held that 265 exhibitors would use 840 booths. This is down from an "oversold" position of 1,000-plus booths last summer, with over 300 "confirmed" exhibitors, plus a growing waiting line.

Among recent dropouts were Univac ("reorientation of marketing objectives") and University Computing Co.

Attendance projections and exhibitor numbers are exceeded only by the past two conferences, in Atlantic City last spring, and Las Vegas last fall.

In noting the precedent-setting (Continued on Page 4)

Study Reveals Underuse How Efficient Are DP Centers?

By Michael Merritt

CW Staff Writer

NEW YORK During scheduled running hours, the average corporate computer spends about 30% of its time on reruns, maintenance, and in idle mode. Well-managed centers, however, spend only 19% of their time on these non-productive activities.

This is one of the conclusions reached by a recent study of 89 corporate DP centers using 155 computers conducted by A.T. Kearney & Co., management consultants.

Principal partner of the company, Walter J. Schroeder, told CW conditionally that if the total round-the-clock available time was considered, the comparison between well-run DP centers and the average is even more dramatic, the 22 best companies in the survey were operating productively 68% of the time, while the average was only 40%.

The best companies spent 10% of their sched-

uled hours in idle mode, 6% on reruns, and 3% on maintenance. The average was 20% idle, 5% rerun, and 5% maintenance.

"Strangely enough, the largest centers had the poorest record," Schroeder said. "This is because of scheduling problems; the larger centers are harder to manage, because they have more structured, inflexible organizations."

The solution to the problem, Schroeder said, is new controls and more training.

Schroeder said that his firm's study has shown that the rosy dreams of effective use of computers have not come true. He cited three promises of the sixties that have not materialized.

A reduction of middle-management personnel required by corporations as the computer began talking over routine decision making functions.

Improved profitability and return on investment as a result of EDP functions fulfilling their

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For Weave Design

IBM Employee Receives Software Patent

By Edward J. Bride

WHITE PLAINS, N.Y. — The first IBM employee to receive a software patent is Mrs. Janice Lourie, who programmed a computer to interface with a fabric loom and a video display terminal.

The results of the program are user-designed textile patterns, woven in real-time at the command of an operator with a light pen.

Mrs. Lourie is a Senior Institute staff member at IBM. She first applied for the patent three years ago, but it was only recently issued.

The "invention," based on the patented program, was first shown in the IBM display at the 1968 HemoFair in San Antonio. Visitors to that exhibit were given souvenir fabric patterns which had designed on a video display unit.

"Hard Copy" Pattern

Under the program, the operator draws an intended design on an IBM 2250 CRT terminal, the program translates the design into instructions for the loom, and a "hard copy" pattern is woven.

The designer/operator can make changes without redrawing the entire design, thus saving time in both the drawing and weaving stages.

Mrs. Lourie's technique replaces the time-consuming method of keypunching cards, using a hand-drawn pattern from graph-paper as a guide and the punched cards to instruct the loom.

IBM spokesmen said the company did not consider the award a true "software patent," since the design program is not a product, i.e. it is not being marketed.

The difference, one spokesman explained, is in the definition of "software," since IBM considers only "program products" and "system control programs" as being eligible for software patents.

A Patent, Is a Patent

The award, then, is for a "significant concept," according to IBM, and is entitled "Graphical Design of Textiles," according to the Patent Office.

In legal jargon, the patent describes the invention as a "method of operating a data

processing system having... data manifesting means for graphically developing a textile weave design" from the outline on the display.

A specially designed loom, and

attitude recently acquired a 360/30 to perform administrative work, with the long-range goal of also using the Model 30 as a controller for the loom.

The "improved" form of the

fashion Institute, IBM noted.

Sidney Buchman, coordinator of data processing at the Fashion Institute of Technology, said it was feasible that the loom-computer tandem might be used for knitting, as well as weaving.

He said it takes only a little "imagination" to envision a sheep entering one end of an assembly line, and a knitted garment leaving the opposite end. But, Buchman did say the invention would be "put to good use" on an experimental and developmental basis.

The Fashion Institute has over 1,900 full-time students, all being trained for entry in the fashion industry.

Buchman didn't know, and IBM refused to speculate, on its possible entry into the fashion world. An IBM spokesman would only say that the Lourie invention was "not now a product," but he would not, as is company policy, elaborate on any plans.



Mrs. Janice Lourie and IBM patent attorney Charles P. Boburg discuss a portion of her patent description.

an improved version of the program, were both presented to the Fashion Institute of Technology in New York. The in-

venting program is covered by another of Mrs. Lourie's patent applications, and is being tested for "educational purposes" at

Sigma 9 Continues XDS Commercial Trend

(Continued from Page 1)

multiple, simultaneous access to core memory.

CPU, IOPs and memory each have individual clocking permitting asynchronous operation. Foreword interleaving in memory also results in higher effective memory speeds.

Two models of IOPs are available. The Dual-Channel Multiplexer IOP handles up to 32 peripheral devices at channel transfer rates up to 900,000 bytes/sec in the multiplexing mode. The Rapid Access Disk (RAD) IOP is used with RAD storage units only. Data transfer rates up to 3-million bytes/sec can be handled.

Up to 224 interrupts can be provided, with hardware determination of interrupt priority. Two blocks of 16 general-purpose registers are standard. These are optionally expandable to a maximum of 64 in increments of 16.

In addition to the decimal arithmetic capability required for commercial applications, the Sigma 9 provides fixed and floating-point.

Word and double-word precisions are available in fixed and floating-point, halfword in fixed only.

Two real-time clocks are standard, with an extra two optional. Both master, and slave and master memory protect modes are available.

The basic architecture of the smaller Sigma computers was the foundation for the Sigma 9. This enables user programs now running on the Sigma 5, 6, and 7 systems to run without alterations on the new system, XDS said.

Sigma 9 will use all the peripheral equipment now in use with the other Sigma systems.

In addition, a new commercial line printer, the Model 7446, announced with the Sigma 9, will be available for use with the other Sigma systems. Scheduled for delivery in the third quarter of 1971, the device can print up to 132 columns at speeds as high as 1,500 lines per minute.

A typical Sigma 9 system, with 128K words of main memory and including a variety of peripheral equipment, will have a sale price of \$1,760,000. The one-year lease price will be \$41,000/mo.

Model	XDS 9	RCA 7	Burroughs 5870	IBM 370/148	IBM 370/155	NCR Century 300
Features						
CPU	20.5	14.4	18.2	10.4	21.5	9.8
Monthly Rental (\$K)	39.7	38.8	18.4	18.4	45.2	61
Memory Size (K bytes)	512 to 2,048	256 to 1,280	128 to 256	112 to 512	256 to 1,280	128 to 2,048
Cycle Time/Byte (nsec)	225	190	625	136	60	163
Byte/Access Cycle	4	8	2	2	4	4
Channels	352	7	4	6	8	41
Processors	4	1	2	1	1	1
Interfacing	4-way	None	None	None	None	4-way

Chart compares XDS Sigma 9 with other recently introduced systems.

Xerox OS Suited for Local, Remote Batch Jobs

By Donald Levitt

EL SEGUNDO, Calif. — The development of a business-oriented operating system for use on the XDS Sigma 9, and on the older Sigma 6 and 7, emphasizes the company's new direction to a business user's processing environment.

The Xerox Operating System (XOS) is a transaction-oriented system designed primarily for local and remote batch business-type jobs. Scientific and time-sharing applications, areas previously stressed by XDS, can be handled concurrently with batch

jobs, but in a background mode, under XOS.

To support the commercial user, the system includes an XDS Cobol compiler which conforms to Ann standards, a Meta-Symbol assembler, and a Data Management System. Extended XDS Fortran IV and Fortran Load and Go (Flan) compilers are also available along with a Sort/Merge utility and a Basic compiler.

XDS said that XOS provides both complete multiprogramming and multiprocessor capability.

To handle multiprogramming,

XOS uses the interrupt structure for internal task scheduling, and the system's memory map to allow programs to be stored in regard for contiguous core space. XOS uses dynamic resource allocation techniques to maximize the number of currently active jobs, the company said.

In supporting concurrent multiprocessing, the system treats remote batch jobs in the same manner as it does local jobs. Spokesmen said that as many as 48 time-sharing users will be accommodated by XOS.

XOS provides for sequential,

indexed sequential direct-access and/or partitioned file formats on magnetic tape, rapid access fixed-head disk, and removable disk storage. XDS said.

Included in XOS, XDS said, is a generalized Telecommunications Access Method (TAM) that enables the user to process his applications programs from the telecommunications network.

The Xerox Operating System is scheduled for delivery in the third quarter of 1971, the company said, but time-sharing under XOS will not be available until the first quarter of 1972.

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Manufacturer Safeguards For Data Called Inadequate

CW Midwest Bureau

CHICAGO — While high interest in security was shown at the recent well-attended American Management Association seminar on catastrophe prevention management, some of the experts and most of the attendees there felt that not enough was being done at the computer manufacturing level to safeguard data in the on-line environment.

It was pointed out in one of the seminar's question and answer periods that computers were being made larger and larger, faster and faster, a fact which, for economical operations, almost necessitated multiuser use; but that next to no software was being offered in hardware or in software to provide security for data transmission or access.

"Not only can data be stolen by wiretap," said Louis Scoma Jr., president of Data Processing Security, Inc. and a cochairman of the seminar, "but even data that is coded and unintelligible to the wiretapper can be sabotaged by wiretap."

He explained that data can be modified during transmission if the wiretapper knows his business.

Scoma placed the responsibility for on-line security with the corporate user and with the equipment manufacturer. "Not enough," he said, "is being done, and being done fast enough, to help solve the problem of data loss in transmission."

User Responsibility

He said that since manufacturers felt that data security could best be obtained by the addition of crypto equipment, it was the responsibility of the user to insist on built-in safeguards in hardware and in software.

"A scrambler is not and should not be the answer," he said.

Another speaker told of a government project in which a manufacturer is co-operating. Both the equipment and the software are being designed so that the designers are during both government supervisors and manufacturing representation to attempt to extract data in any conceivable manner from an on-line transmission and obtain usable information.

The results of this research are expected by the end of next month.

A.E. Frei, director of Sonic 360 Reservations Systems for Continental Airlines, described, in a presentation of Continental's system, a method of security for data in the on-line environment.

Frei said that each terminal has a unique address which serves as the primary source of data control. The agent's assembly area, a specific data record assigned to each set internally, provides, Frei said, the key link for all data transmission to and from a terminal and is the principal source of system security.

Unique Number

Each agent, Frei explained, is assigned a unique number. Each city on the airline's system has an internal data record containing a list of all the agents in that city and the duty codes each agent can perform.

Each agent comes on duty and must sign in by entering his ID number, his duty code, and his initials. If a match is made, the agent receives an "OK" and the agent is free to operate the system within

California Signs With Ticketron

SACRAMENTO, Calif. — The California State Parks and Recreation Department has signed with Ticketron, Inc., a New York-based ticket reservation service, to handle campsite reservations.

The department had signed with Computicket and had the plan in operation when the company folded in April and it was forced to go back to manual methods.

its limits of responsibility.

The agent's sign-in is stored, and all transactions conducted by that agent are checked against his sign-in.

Company rules state that the agent must sign out if leaving his set, which would prevent him, or anyone else, from using his codes and numbers until another sign-in was made.

Discussion later with both the attendees and the experts seemed to uncover a mutual dissatisfaction with what is being done in on-line security.

While Continental's security system would prevent certain fraud attempts, it would not, it was felt, prevent data theft by line tapping. In his presentation, Frei had pointed out that the value of the data would have to determine the cost determination of the security.

Youth Indicted in Data File Copying

LOUISVILLE, Ky. — A Cincinnati youth was indicted by the Grand Jury here on charges of transmission of "stolen" properties interstate by wire, radio, or television "for alleged unauthorized access on a time-sharing network."

Steven M. Coffman, 18, was arrested in July by agents of the Federal Bureau of Investigation (FBI, July 29) acting on a complaint filed by South Central Bell Telephone in behalf of its Louisville customer, Metridata Computing, Inc., a T/S firm.

According to the FBI, Coffman allegedly seized a long line leased to Metridata and then, using Metridata code numbers and passwords, extracted data from the records of Metridata and some of the firm's customers using a telephone and a teletypewriter in his employer's offices.

Coffman was arrested after FBI surveillance and after several telephone long-line traces linked the "unauthorized" use of Metridata Computing's system to a firm at which he was employed.

FBI agents said that Coffman was very close to completely bypassing Metridata's security programs when he was apprehended.

Coffman was arraigned in Louisville in the U.S. District Court for the Western District of Kentucky, at which time he entered a plea of not guilty.

The defendant requested, and received, a change of venue from Louisville to Cincinnati.

A spokesman for the U.S. Attorney's office in Louisville said that the government plans to contest the change of venue.

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Privacy Commission Chairman Suggests Licensing Plan

CW Midwest Bureau
CHICAGO - Witnesses appeared before the 15-member Illinois Data Information Systems Commission here recently to assist the commission in its study of ways to counteract unrestricted computer analysis that could violate the privacy rights of the citizen.

Allocating responsibility to safeguard privacy squarely on the shoulders of programmers and analysts, Sen. John Lanigan (R-Chicago), chairman of the commission, said that one of the results of the study could be a proposal to license analysts and programmers.

"A check could be provided by establishing a code of ethics which, if breached, could be

grounds for taking the license away.

"Licensing," he said, "could also be helpful in passing on a person's qualifications for a computer job."

Harry L. Sweat, director of planning for Honeywell, testified that users have not asked for built-in safeguards.

"Manufacturers," he told the commission, "are more concerned about privacy than any other industry because it is the computer itself, and not who is using it, that gets the black eye."

"Manufacturers Concerned"
Sweat told the commission that licensing of computer personnel would be "a cop-out. . . That's the lowest priority."

One witness, an author of books on the subject, told the commission that computers offer great potential for privacy, but that "they also present the gravest threat of invasion of our innermost thoughts and actions."

The witness, Dr. Jerry M. Rosenberg, a New York psychotherapist, consultant, and author, said at a public seminar that giant computers are displacing widely dispersed files on American individuals.

Rosenberg claimed that computer manufacturers have "shirked their responsibility" by not developing built-in safeguards against information leakage.

"The public has the right to

know," Rosenberg said, "who will have the power to control the computers, and most importantly, how confidentiality and individual privacy can and will be protected."

Norman J. Ream, described by the commission as a New York management services executive, stated to the commission that the establishment of large gov-

ernmental and intergovernmental data banks would not necessarily infringe on the citizen's rights of individual privacy but would rather promote greater governmental economy through efficiency.

Chairman Lanigan said that the commission will hold additional hearings before the General Assembly in March.

Oklahoma Senate Awaits Study on DP Feasibility

CW Midwest Bureau
OKLAHOMA CITY - The University of Oklahoma is presently conducting a feasibility

study on whether the state legislature should use computers, according to the office of state Senate president pro tempore Finis Smith.

A portion of the legislative use would be, according to the senator's office, the taping of Oklahoma statutes. A contract was let to the Aspen Co. for the tapes, but the senator has been quoted as saying that the tapes were not usable for the legislature due to inaccuracies.

The senator has asked the state's attorney general for a determination as to whether or not the state should file a breach of contract suit against Aspen Company.

According to Rob Gee, Senate administrative assistant to Smith, there has been no decision from the attorney general.

While the final report on the feasibility study has not been received from the university, Gee feels that the report will indicate the advisability of computer use by the state legislature.

No comment was available from officials of the Aspen Co. regarding the possibility of suit.

Stanford Keeps Track of Bugs

PALO ALTO, Calif. - Since the beginning of this month a computer has been keeping track of the germs at Stanford University's research hospital.

Information from laboratory tests is fed into the computer which determines whether the test needs repeating, keeps track of which antibiotics are successful against different types of bugs, and helps doctors prescribe medication.

Laboratory tests have been known to be influenced by human error, Stanford researchers said, and the computer system will provide better quality control and reliability. The results will be "improved diagnosis, timelier treatment, and far less medical paper work."

Computers on the Scene

CHICAGO, Ill. - Computers have arrived on the scene to aid professors struggling to meet the publish or perish compulsion. An Illinois professor ran 2,155 lines of Shakespeare's sonnets through a computer which produced 24 pages of analysis.

Among the findings: Shakespeare used 3,211 different words in the sonnets; 136 of these are "monosyllabic function words"; 'couldst' is used once, 'and' is used 490 times, and 54.93% of all words are monosyllabic function words.

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VIP Head Sees Switch To Services in Decade

By A CW Staff Writer

RICHMOND, Va. — The time is ripe for "a complete reversal of emphasis from hardware to services," according to Joan M. Van Horn, president of VIP Systems Corp.

"Computers have been oversold," Miss Van Horn told CW. "Companies are finally becoming result oriented. Management is no longer interested in new hardware for its own sake; they want to know what they can get out of it."

Contending that the future of data processing lies in effective computer power rather than just running computers, Miss Van Horn noted, "In the future this may mean the use of computer services rather than an in-house computer, or a mix of the two."

The service bureau head also predicted the imminent blossoming of the information processing utility. "Other computer service operations will tend to combine, merge, affiliate, or franchise with these nationwide communications oriented services. And the impact on other segments of the computer industry will be profound."

Miss Van Horn estimated that hardware consumes 80% to 85% of DP budgets presently, while software accounts for 10% to 15%, and services 5%.

Complete Reversal

"In the next 10 years you are going to see a complete reversal of this ranking," she went on. "Services are going to become the major segment of the industry, representing well over 50% of the purchasing dollar. Second will be software and third will be hardware."

"This shift will be caused by the shift to the external use of

computer power through the computer utility and away from internal, in-house computer usage."

Economies of scale constitute one of the main reasons for the turn to information processing utilities, Miss Van Horn noted. She also said that a utility may be able to provide faster turn-around time than the in-house DP center.

"In other words, the proprietor of a small company may be better able to get a special management report on demand from the information processing utility than from his own computer center, which is heavily scheduled for maximum cost effectiveness, but has no flexibility for special management demands."

Marketplace Change

The structure of the DP marketplace will change, too, Miss Van Horn forecast, as mainframe manufacturers cease dealing with end-users and the utilities take up the role of data processing retailers.

Corollary to this prediction, Miss Van Horn said that IBM's market dominance will disappear, and it will become "one of perhaps five major computer vendors, each having between 15% and 30% of the market."

"We will see the information utility moving from numeric and word processing to on-line pictorial processing within the next decade," she said.

Concerning the threat of misuse of data banks, Miss Van Horn said, "I think that by the end of this decade we will have lost a great many of our fears and dismissed a great many of our hogwashes concerning such notions as data banks, invasion of privacy, and Big Brother."

Study of Centers Details Ineffective DP Utilization

(Continued from Page 1)

primary purpose of providing faster and better information.

• EDP managers, by virtue of their analytical training and understanding of the business through information systems becoming the general managers of their enterprises.

The study also showed that in the average center only 48% of available computer time is used productively, based on the computers' utilization only 64% of the available time and not round the clock.

In addition, 25% of the manned hours are wasted in the average center.

He said that 42% of the companies do not maintain accurate records of computer performance. This makes effective analysis of inefficiency most difficult.

Because of technical advantages, firms using multiprogramming achieve higher production.

Schroeder concluded that the "findings of this study suggest

that the EDP manager of the '70s must become a much more effective manager of the resources with which he is entrusted.

This study indicates the total burden of excess computing capacity in the U.S. is nearly \$3.5 billion. Elimination of idle time and reruns would increase throughput about 20% and reduce costs by about \$1.2 billion per year.

"Elimination of unmanned hours would provide a 75% increase in computer throughput. This is equivalent to about \$2.25 billion in computer rental per year.

"These projections do not even consider the improvements which can result through use of available technology in the equipment now installed. The wave of criticism of both computers and those who work with them, seems to be in some ways justified.

"The status of the EDP manager is best characterized by one word — opportunity," he said.

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Editorials

Back to the Drawing Board

A computerized vote counting system should provide three things: reliability, economy, and speed. Punch card voting, in at least three major cities, flunked out again last Tuesday.

Considering the importance of elections, and acknowledging the need for a faster system than paper ballots and a cheaper system than currently available voting machines, it seems to us that development of a really good computerized voting system should be undertaken at once.

Perhaps ideally the project should be funded by a foundation and undertaken by a university. The system could then be licensed to private companies which could charge lower prices because they would have no development costs to recover.

The current mess is doing neither the public nor the computer industry any good.



"I'll Decide Who's a Professional"

Letters to the Editor

Solutions Looking for Problems?

Regarding the article [CW, Oct. 21] on library automation, [The U.S. Office of Education] USOE and Lanekin are embarked on a fruitful but difficult mission analogous to development of an SST.

One can design a Mach 2 aircraft on the drawing board. But getting it to fly successfully with a payload requires advances in physical and chemical metallurgy, fabrication techniques, machine tooling, construction methods and transfusions of impressive amounts of capital with a payout only dimly, if at all, evident financially; some would say sharply less evident sociologically.

Librarians, as repositories of knowledge, are beginning to find technology hastening to meet them on their ground and within their economic framework as advances in COM, MIC, communications technology, micropublishing, audio-video techniques, terabit data bases coupled with increasingly cost-effective computational methods and processors come to their assistance.

Wouldn't it be nice if our country and its people generally felt that broadening the horizons of educational opportunity and utility was an exciting kind of Mach 2 "trip"?

Salentien are "solutions looking for problems" and their concerted efforts assist materially in the cross fertilization and intradisciplinary methods which we (who are working in areas of Lanekin's beanpatch), look for in obtaining forward-looking and cost-effective implementations.

Librarians are, by necessity, frugal with scarce resources. Their austere environment is excellent for the evolution of value-engineered systems and hardware.

Continuing exposure by CW in this area will assist in the gentle conversion of "library" types to "our" types - and even vice-versa...

Cedric Sheerer, Consultant

Los Altos, Calif.

University Did Not Sell Computer Time to Candidate

Your Sept. 30 issue carries an article entitled "Mass Primary Sees Two Candidates Use Computers," which includes the statement that computer services used in the primary campaign of Rev. Robert F. Drinan were "...rented from MIT."

The statements are in error; computer services used in Father Drinan's campaign were not obtained from MIT. MIT's policies do not permit the sale or use of computer facilities on behalf of candidates for public office.

Robert H. Scott, Director
Information Processing Services

MIT

Cambridge, Mass.

Confusion apparently arose from a statement by candidate Drinan regarding the consultant company, a founder of which is also a lecturer at MIT. The computers contracted for the work were reportedly those of two local firms. Ed.

Comment on IBM Marketing

An article in a recent *New York Times* indicated that Thomas Watson, on his visit to the Soviet Union, found there was a difference in marketing approach between the IBM Corp.'s approach and that of the Soviet Union. It was not indicated what the difference might be.

It appears that the difference is that IBM believes in an IBM monopoly of the computer market within a country and the Soviet Union believes in a state monopoly and control of the computer market within its country.

The IBM way seems to work within the U.S.

Thomas F. Doyle
Vice-President

George S. McLaughlin Assoc., Inc.
Summit, N.J.

Response/360 Prices Corrected

Thank you for publishing your article on our Response/360 Inform package [CW, Oct. 14].

The price you quoted for our Response/360 service is really for our Response I service. The correct Response/360 prices are: \$9/hr for connect time, 30 cent/sec for CPU time, and \$1/mo/3,440 characters of storage.

Everett R. Daly
Product Manager

Response
Leasco Time-Sharing
Washington, D.C.

How You Can Locate Salvage Company

A number of readers have inquired how they can locate a salvage company interested in buying their discarded punched cards and print outs.

Since pricing a national list of salvage companies is impractical, we suggest that persons interested in selling their waste paper look in the classified telephone directory under "Paper Stock - Waste" and under "Waste Paper."

Companies listed under these categories will either make arrangements to pick up waste paper or will be able to advise where such a service can be obtained locally. Ed.

What's New in the Fed? This Firm Has the Data

WASHINGTON, D.C. - The Center for Political Research (CPR), a two-year-old firm, uses a computer to tell its clients what's going on in the Federal Government. "We're sort of bookkeepers of what's happening in the government," said President Anthony C. Stout.

CPR Research Services, one of two divisions within the

D.C. Data-Lite

By

Alan Drattell



computer file in the world on incumbent congressmen and their constituents, according to Stout.

The data bank collected serves as the nucleus for several statistical routines.

For example, a set of up to 100 different characteristics is maintained for each congressional district (CD) in each state.

These characteristics, or predictor variables, are correlated with congressional roll call data through the application of statistical routines. The results are used to analyze congressional voting behavior.

In the 10th CD in Indiana, for instance, the computer has noted the following: the largest city in the district is Muncie, with 68,603 people; 36.8% of the population are white collar workers; 70.3% of the residents own their own homes, with a median value of \$9,930; the biggest industry is the manufacture of durable goods.

The computer also indicated in fiscal year 1968, the Department of Defense spent nearly \$60 million in the district; and President Nixon received 50.5% of the vote in the 1968 election. The voting record of the district's congressional representative, is given by name, date and vote cast.

Normally, by analyzing pre-

vious votes of individual congressmen, CPR is able to come up with a prediction of how these representatives will vote on future legislation. "Lobbyists, big corporations and others are interested in such information," Stout added.

CPR is also analyzing what Stout called "deviant voting." He explained: "The computer can give us clues, for example, to why a man may have suddenly voted a certain way when his prior voting record shows a completely different pattern on similar bills."

"We have a listing of all corporations and unions in a congressman's district, for instance, and we might find that his vote could have been influenced by certain types of companies or unions located in the CD."

The company utilizes an IBM 360/57 at National CSS, Inc., a service bureau in Stamford, Conn. Its link is a Datel teletype terminal in CPR's Washington office. Software for the project was done by Mathematics of Princeton, N.J.

"All of our information was previously on System Development Corp.'s time-sharing system in Washington," Stout related. "SDC lost a great deal of money on its operation and they closed down about April 1."

"We had to pull back, reprogram our project and find a place to hang it. SDC did give us limited access to its California machine until June 1. On June 15, we went on the air with National CSS."

The file contains approximately 19 million characters of data. "Nobody," added Stout, "ever put Congress' votes in a computer and accessed them before."

Input to the system is from various sources, including CPR designated state political desks that the company maintains. Data comes from periodicals, newspapers in the states, plus the 70 CPR correspondents throughout the nation. Update varies and is currently about once every two months.

The Question Arises: Who Will Control DP Problems?

The computer area has been hit by many failures in the past years. More than likely you may have brushed them off as being comparatively unimportant; when contrasted with the great successes. However, it seems that this perhaps necessary ability existing inside the industry to shrug off the failures is being quickly dissipated outside the industry.

The Taylor Report

By Alan Taylor, CDP



as the computer applications wider and touch more nearly the rest of the population.

In particular, the voting fascios are stirring legislators to action. One of the country's most active legislators (remember what it did in the antipollution field when no one believed that cars would ever be controlled) is the California one, based in Sacramento.

Recently, the California Senate passed a resolution about this area which states quite clearly that it intends to do something. And, where California is concerned, we are dealing with a state that is quite capable, and competent to really take action in this matter.

Subsequent to the resolution being passed I received a letter from the consultant to the Senate committee concerned. I would like to share this letter with you, without any further comment.

I think that this may be extremely important, and I would like to suggest that when you have read it you contact Mr. Cathcart, or myself and let us know what you think.

The only action which has so far been taken, incidentally, is that a hearing on the licensing of computer programmers, and operators was called for January. Here then is the letter.

A committee hearing to consider Senate Resolution 240, relative to computer operators, [and] chaired by Sen. Alfreid H. Song, [is expected to be held in January]. All interested persons who wish to testify are requested to notify the undersigned as soon as possible so that they may be included in the agenda.

A broad staff study preparatory to this hearing has revealed that computer program and output can have massive effects. Both individuals and society at large may incur serious injury because of faulty programming, generally with little recourse, because our legal system is geared to non-computer technology.

Many computer programs involve extremely sensitive areas involving the privacy of individuals and the security of company records, with few legal sanctions

against unauthorized use of computer output now in existence.

Little, if anything, is available today to insure responsibility on the programmers and software companies.

The quality of training schools ranges from poor to good, but it is difficult to determine objectively because there are no standards for testing the competency of the graduates.

In fact, there does not appear to be any recognized definition of a computer programmer.

A clear need exists for major modifications in criminal and tort law to accommodate computer technology, and in the area of regulatory law with which this committee is most concerned.

There is an equally clear need

for establishing standards and means of insuring that these are met by programmers, software companies, and training schools.

The committee will be exploring to what extent the state should be involved in the establishment of standards for the data processing industry. The committee naturally invites your comments relative to this hearing before the hearing date.

James A. Cathcart, Consultant
Senate Committee on
Business and Professions
Room 2044
State Capitol
Sacramento, Calif. 95814.

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Song's Senate Resolution 240

Whereas, The electronic computer has become one of the most important tools in modern business and government; and Whereas, Public confidence in the reliability of the electronic computer has been severely impaired by failures during the counting of ballots in several counties after the recent primary election; and

Whereas, Neither the electronic computer business nor the professional competence of its technicians is subject to any regulation whatsoever; and

Whereas, It is in the public interest that electronic computers be operated and maintained in such manner as will merit confidence in their accuracy; now, therefore, be it

Resolved by the Senate of the State of California, That the Senate Committee on Rules is hereby requested to assign to an appropriate committee for study the subject of licensing and regulating the electronic computer industry and electronic computer technicians; and be it further

Resolved, That such committee report its findings and recommendations to the Senate on the date specified by the Rules Committee upon assignment of this resolution.

Letters to the Editor

Reader Seeks Support For Post-Processor

Alan Taylor has spotlighted some of the problems with the implementation of the Cobol language. The problems of Cobol should be kept in the spotlight and not brushed aside as "little inefficiencies." These little inefficiencies become "computer eaters" when they are generated into the hundreds of subroutines that make up a single system.

In particular, I wish to address the IBM ANS Cobol compiler. We have studied some of the compiler output and we are convinced significant improvements can be made.

We have approached our IBM representatives about optimizing the output of the ANS Cobol compiler and they responded that an indication of general interest was necessary in order to consider it. IBM users, let's make our needs known!

As Alan Taylor points out, a new compiler would take too long. As an alternate proposal what about a compiler post-processor? A post-processor has several advantages over a new compiler.

• A post-processor would probably be available sooner than a revamped compiler. Modifying a compiler is typically a long complicated process.

• The compiler would not require more core since the post-processor would be a separate job step. This would make optimization possible for

more users with smaller machines.

We would not have to consider sacrificing any language specifications to achieve optimization and, therefore, the post-processor would be more generally usable.

• The user would select optimization only when he felt it was the most advantageous.

Since optimization could be relatively expensive, the user might not find it desirable during the testing phase or for one-time programs.

IBM Cobol users, please contact me at Aetna Life & Casualty, 151 Farmington Ave., Hartford, Conn. 06115, so that we can push for a solution.

Judy Packer, Administrator
Language Research,
CDP Support

Aetna Life & Casualty
Hartford, Conn.

Teach Programmers How to Write Programs

The Cobol efficiency series by Alan Taylor has resulted in some interesting replies from CW subscribers. I think the problem was neatly summarized in the first paragraph of your letter from my former associate and long-time friend and Fortran programmer, Newell Usher (CW, Sept. 2).

If Cobol is selected, we should be sure that our programmer can write an efficient Cobol program. Assigning an auditor to

redo a poorly written program will result in a "kludge."

In addition, I would recommend selecting the auditor from the defensive line of the Minnesota Vikings and assigning him a food taster.

If we are getting Cobol programs which require only the changing of a "few statements" to make them efficient, it's probably because our programmers aren't aware of what is and is not efficient. They need a course in Cobol statement efficiency.

This will include the machine language resulting from selected Cobol statements and combinations of statements. This should bring the point home even if the programmer can't read machine language.

Often the problem is more serious. Unless the program is well designed and built, no one, including an auditor, can make it efficient, only a little more efficient. The solution is to teach the programmers how to write programs. Don't confuse this with learning how to form Cobol statements.

Programmers should be taught how to design and build programs to suit a purpose. This is where much of the efficiency is now lost. And it is independent of language.

Paul P. Clement Jr.
Product Planning Manager
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Chicago, Ill.

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Capex Cobol Optimizer Cuts Object Programs 30%

PHOENIX, Ariz. With the Optimizer package now available from Capex Corp., OS/360 users can reduce Cobol F object program size by an average of 30%, and use the core saved to speed execution of the program, or run additional programs.

Capex said that a version of Optimizer is also being developed for ANS Cobol.

The package reduces CPU time by stripping the compiler-generated code that does not apply to the program being optimized. Further, Capex said that Optimizer cuts execution time of I/O-bound programs by generating extra I/O buffers and/or by adjusting the OS-chained scheduling capability, which reduces channel and wait time, to be activated.

Optimizer is transparent to the

user. No changes in the Cobol source code are required and no changes have to be made to the operating system. The package can be used under any of the OS options, including RPL, MVT or MVT.

Capex explained that Optimizer reduces the size of an object program by minimizing register loads, address constants and perform linkage code. Capex emphasized that Optimizer cannot improve program logic; it can only strip unnecessary code instructions generated by the programmer's source statements.

To operate, Optimizer requires a region of 128K bytes or a region as large as the object program, whichever is larger, and direct access storage for temporary work-files. The package will optimize single object program

modules up to 512K bytes in size.

Execution time of the Optimizer process is generally less than 50% of the compilation time, according to Capex, but varies depending on the structure of the object program being optimized and the CPU on which the optimizing is being

done.

The program listing generated from Optimizer includes the object code, in optimized form, interwoven with the source statements that generated it, for ease of debugging. The system also provides a report highlighting any problems encountered, and unresolved, by the Optimizer.

The Optimizer for OS/360 Cobol F costs \$15,000 plus \$1,000/yr for maintenance after the first year. The company also offers a version of the Cobol version, when ready, would be available to users of the Cobol F Optimizer at reduced cost.

Capex Corp. is at 2613 North Third Street.

RCA's Guaranteed Software Conversion Contract Seen As Real Benefit To User

BOSTON - RCA's guaranteed software conversion contract may be of very real benefit to the user, according to several software houses that have already done their own in-house conversions from DOS/360 to RCA Tape Disk Operating System (TDOS).

Under RCA's conversion plan, current DOS users of IBM 360/30s, 40s and 50s would be guaranteed successful conversion support to the RCA 2, 3, 6 or 7, for a negotiated fixed price based on complexity of the programs.

Cullinane Corp. anticipates that RCA should have little trouble in the instruction/recode sections of the converted

programs. Some what more trouble, but still nothing serious, may occur in the environment section of Cobol conversions. The most problems will show up in the distinctly different Job Control Language (JCL) required under the IBM and RCA operating systems, the company said.

Informatics agreed that the operating system interfacing is the most significant problem. An awareness of the functional differences between the IBM and RCA access methods is even more important than the differences in the JCLs, Informatics said.

Applied Data Research re-

operating system interface problems and wondered whether RCA could in fact provide enough two-way expertise to successfully convert highly complex programs. ADR admitted, however, that RCA could undoubtedly handle "run-of-the-mill" programs, and that this would be good enough to serve the needs of most users.

RCA probably can write a special program to convert IBM's Cobol assignment clauses into RCA acceptable format, Cullinane surmised. In the procedure division, there are few enough discrepancies between IBM and RCA verbs so that a short checklist would serve to spot those that need re-coding.

NSF Project Sells T/S Programs For \$1 Apiece

BELOIT, Wis. - Time-sharing programs covering a wide range of topics are available at token costs, through a project funded by a National Science Foundation Grant, and Beloit College. The Social Sciences Instructional Project (SSIP) has acquired programs from many sources and adapted them to a time-sharing mode. The programs cover areas as diverse as accounting, psychology and operations research.

Most are written in Fortran IV for easy implementation on many CPUs, including, thus far, the IBM 1800 and 1130, CDC 6400 and Burroughs 5500 processors.

The programs presently available include a terminal version of a financial simulation package, with new options, and a large interactive world politics simulation game. Others are said to provide practice in elementary probability and experimental methods for psychology students.

Those interested in operations research can use Simul, which simulates the behavior of queues or waiting lines under a wide variety of assumptions concerning distribution of arrival and service time.

Probability and Statistics programs include one that generates up to 250 random numbers from a normally distributed "population" with mean and variance programmed by the user. Others include adaptations of IBM's Scientific subroutines Tab1 and Tab2, which tabulate the actual and percentage frequencies of data over equal class intervals.

The Anvar program provides general analysis of variance, and Mrcap is said to perform multiple regression, correlation, analysis of residuals and least square predictions.

Single copies of the specifications of these and the other programs in the SSIP library are available without charge. Complete listing of any specific program is available for \$1, while punched card decks for all programs are priced at \$1 plus postage.

One or more programs will be copied onto a single magnetic tape for \$5. To take advantage of this option, the user must provide a 800 bit/in., 8-track tape.

The Social Sciences Instructional Project is under the Department of Economics and Business at Beloit College, here.

Basic and APL Available on TSR

NEW YORK - Time Sharing Resources (TSR) has added Cal/360 capabilities to its service and, as a result, the user has a choice of APL or an enhanced version of Basic on the same network.

TSR noted that Cal/360 also supports PL/I and Fortran IV, giving users more flexibility in their language. Restating his feeling that APL is an ideal time-sharing language, a TSR spokesman said that users still want more other options. The Cal/360 implementation seemed the best way to provide them, he added.

In addition to providing the choice of languages on its service, TSR has recently added a remote job entry capability, permitting data entry and analysis from terminals at speeds up to 2400 bits/sec.

TSR users are charged \$11/hr of connect time and \$6/min CPU time, with one minute CPU free for every connect hour. The storage rate is \$1.50 for every 7200 characters. There is no minimum charge.

TSR has its offices at 22 West 48th Street.

Firm Plans Organic Compound Data Base

CLEVELAND - A tape-oriented database describing approximately 15,000 organic compounds will be available next summer, according to the developer, Science Databank Inc. (SDB).

The Codak/Organic database uses the table of physical constants of organic compounds from the Handbook of Chemistry and Physics, plus related material. The data base is organized sequentially, based on the handbook compound number.

Records for each compound

include digitized representations of the infrared, ultraviolet and nuclear magnetic residue data, the Chemical Abstracts Register number and the Wiswesser Line Notation. Each compound has a "directory" entry which defines the records in detail, SDB said.

The company said the data base would allow the user to get specific information on a given compound or to determine all compounds with a given characteristic. Relationships between properties, and between properties and structural characteristics

can also be extracted from the file, the company said.

About to be tested on a prototype basis, the data base is expected to be available in either Ebcidic or Ascii format, on 9-track 800 bit/in. magnetic tape.

It will cost \$60/mo for the first installation, on a three-year lease, SDB said that the data base may also be made available through a time-sharing service. Science Databank Inc. is at 18901 Cranwood Parkway.

VIP Text Editing Available as Service, Package

WASHINGTON, D.C. - Large-scale installations and others with special needs to keep all their processing in-house can buy or lease a text-editing package, previously available only as a time-sharing service, from VIP Systems Corp.

VIP said that VIPcom '71 is an enhanced version of the IBM Administrative Systems System (ATS/360), containing more than 100 modifications and extensions of the standard IBM-supplied package.

The company said that many of these changes improve the reliability and eliminate errors which exist in the IBM software. Others provide usage statistics and improve data center operations, including the monitoring of communications facilities.

Another series of changes provide extended capabilities for on-terminals users, including on-line remote batch and photo-composition features. VIPcom '71 is a stand-alone system that

is capable of producing "typewriter" formatted reports on the user's in-house high-speed printer.

The packages also include an interface with VIP's photocomposition services, which are not included in the software being made available now. The photocomposition services utilize Photon equipment to produce proportionally-spaced type set.

Written in BAL, VIPcom '71 has been implemented under DOS/360 and could be used on other processors that support BAL. The system requires at least 48K bytes of storage, the company said.

Purchase price for VIPcom '71 under a license agreement is \$25,000 plus \$500/mo for maintenance. Rental is \$2,495/mo with credit towards purchase. On a time-sharing basis, VIPcom '71 capabilities are available for \$2.50/hr of connect time, with no charge for CPU time.

Charges for printing and storing of data vary with the user's needs, the company said.

The use of the Hex Conversion Tables is available in Boston, Chicago, Cleveland, Los Angeles, Philadelphia, San Francisco and through its Washington, D.C. headquarters at 1145 19th St., N.W.

Book Provides Conversion Tables for 360 Programmers

NEW YORK - A small book published by Programming Science Corp. (PSC) shows 360 programmers the Hex Conversion Tables required in decimal and decimal conversion values from 0000 to FFFF in hexadecimal and from 0 to 65,535 in decimal, directly.

The use of the Hex Conversion Tables requires no addition or subtraction to arrive at conversion values. With direct conversion values, the Hex Conversion Tables book sells for \$3.

Programming Science Corp. is at S.E. 42nd St.

T/S Service Includes Financial Analysis for Planners

RICHMOND, Va. — Corporate planners can use a Financial Analysis System, now available on the Action/APL time-sharing 'network', to study historic data, to develop projections from historic data and/or forecast future situations.

Regardless of the method of analysis followed, the planner is not required to have any understanding of programming to generate his reports, according to network spokesmen.

The reports include spread sheet, a percentage spread sheet and a spread sheet trend analysis. Funds flow and cash flow reports are also possible, as are ratios and ratio analyses. A reconciliation of equity completes the report series.

While more than 80 line items are programmed, the user may change any and all the line titles to suit his special requirements.

Once historical data has been entered, it

may be altered to reflect changes, but otherwise will be retained and available to re-use as often as the user wishes.

According to Action/APL, the system will flag any improperly balanced columns and will assist in the audit phase of the analysis.

Network spokesmen noted that only through the use of APL as the source language were they able to make the analysis system as flexible as it is. Other languages are too restricted, they added.

The Action/APL 'network' is national in scope and is a cooperative effort of four APL-oriented companies: The Com-

puter Company, here; APL Services, Inc., New York; Computer Innovations, Chicago; and Proprietary Computer Systems, Inc., Van Nuys, Calif.

When the network was organized [CW, Aug. 26], spokesmen noted that a nationwide price schedule would "probably" be developed in time. For the moment, however, prices for the service vary from region to region.

Proprietary Computer Systems is at 16555 Saticoy St., Van Nuys, Calif., while Computer Innovations is at 10225 South Western Ave., Chicago.

The Computer Company is at Seventh and Franklin.

Service Firm Adds Two Offices

ATLANTA, Ga. — Lyke-Youngstown Computer Services Corp. (LYCSC) has opened operating centers in Dallas and Houston, Texas.

The firm furnishes commercial data processing services and offers proprietary software packages and custom programs. The Dallas center initially will be offering a newly developed stock broker account-

ing package in cooperation with two other Dallas firms, Affiliated Computer Systems, Inc. and The BVR Corp.

Other LYCSC centers are in Atlanta, Cleveland, New Orleans and Tampa.

Lyke-Youngstown Computer Services Corp. is headquartered at 1447 Peachtree St. N.E., here.

Why install a ROYCO 205/108 memory protector after you suffer a head crash?

The time to detect and prevent hard input/output errors or a disastrous computer memory head crash is before it happens. Not after your on-line computer has lost its memory. After all, your random access memory devices must be reliable. The penalty is a costly computer failure.

But, memory devices do fail. Remember, they're extremely close tolerance devices made and used by people. That's where we come in.



ROYCO 205/108 Head Crash Prevention System in Service Protecting an IBM 2314 Disc Drive

Our ROYCO Model 205/108 Head Crash Prevention System will detect and prevent head crashes and hard input/output errors. It's a memory protector. That's it's job.

How does it work? Simple. The density of particles manufactured inside the memory system is continuously monitored. Internal particle concentration caused by aerodynamically unstable read/write heads, warped or damaged discs, edge loading or other malfunctions that affect head/memory surface operating tolerances is detected. Before it becomes critical. Before a head crash can occur!

The ROYCO Model 205/108 memory protector gives operators audible/visual warning and automatically retracts the heads if desired. To prevent hardware and data destruction. To avoid hard input/output errors. To hold computer downtime down.

That's positive protection. That's what the ROYCO 205/108 memory protector is all about. Besides at \$49.50 a month you can't afford to be without it.

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the memory protectors

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Field Representatives: Boston, Chicago, Los Angeles, New York, San Francisco

AI/Com Adds Advanced Circuit Design Capability to Network

PRINCETON, N.J. — Match, a circuit design program, is available via the AI/Com Line Sharing Service of Applied Logic Corporation. Developed by Appli-con, Inc., Burlington, Mass., Match is said to offer features not generally available in any other program for design of circuits employing filters, passive networks and operational amplifiers.

Optimization, the program's most unique feature, allows engineers to automatically vary the circuit parameters to improve their designs.

Other Match innovations are: ability to perform group delay calculations; convenient simulation of component tracking; frequency and impedance scaling; Smith chart and expanded Smith chart plotting; tables for entering empirical frequency responses; tables for entering rational functional data; capability to

analyze very large cascade circuits.

Match also can calculate the signal transfer ratios of circuits with Z, Y, G, H, ABCD and scattering parameters.

Engineers can plot up to 10 curves on a single graph, notebook size. All results may also be output in tabular form. Engineers can choose their output in single precision (five significant figures) or double precision (ten significant figures).

There is no initiation fee, but, after three months on the network, there is a \$100 minimum monthly billing. Charges are accrued at \$10/hr for connect time, and ten cent/core unit, "a concept based on amount of core storage, time and I/O accesses used.

Applied Logic Corp. is headquartered at 1 Palmer Square.

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November 11, 1970

Page 15

Westinghouse 2500 Is General-Purpose Minicomputer

By Frank Pianta

ORLANDO, Fla. — The list of available 16-bit minicomputers has been extended with the addition of the first of a new line of small CPUs from Westinghouse.

The general-purpose Westinghouse 2500, based on the company's Prodata and other process control units, is intended to appeal to users for industrial, communications, and scientific applications.

The 2500 resembles several other currently available or recently announced units in both price and performance. The cycle time of 850 nsec compares favorably with the faster avail-

able minis. The recently announced Data General Nova 800, for example, will have a cycle time of 800 nsec, while the PDP-11/15 is scheduled to be increased in speed to 890 nsec next April. The leader in speed in this price range, though, is the Varian 6201 with a cycle time of 750 nsec.

From a price point of view, the Westinghouse unit, at \$9,950, is somewhat higher than the approximately \$7,000 price of the PDP-11/15 and Nova 800.

The 2500 does, however, include as standard equipment features that are extra-cost options on some competitive machines. These include double-precision

arithmetic and hardware multiply and divide.

The 2500 seems to be unusually well adapted to use in data acquisition, communications and real-time process control environments through its I/O system. As many as 128 direct I/O channels and 62 buffered I/O chan-

nels are available. Up to 120 external interrupts are available in groups of eight. Direct memory access is also available.

Peripherals include teletype writers, paper tape, punched card, magnetic tape, line printer, fixed and movable head disks, CRT display, contact closure

controllers, and analog I/O systems.

Software for the 2500 is based on that developed for use with the company's P 2000 units and is compatible with that system. First deliveries of the Westinghouse 2500 are scheduled for the second quarter of 1971.

Low-Cost A.B. Dick Desk-Top Device Makes Hard Copies From CRT Display

CHICAGO — Priced at one-third to one-half of similar units, the A.B. Dick direct image desk-top copier makes hard copies

from a CRT display.

Interfaceable to 75% to 80% of current displays, according to the company, the Model 9750 Display Copier can be used for both alphanumeric and graphic output.

The copier can be remotely operated by locating print control at the CRT station, making practical for several stations to share a single copier.

The unit produces dry copies by an electrostatic process. Copying speed is 12 seconds for the first copy and eight seconds for successive copies.

Paper handling capacity of the copier is one 460-foot roll. The unit can also hold a 350-foot roll of minipaper for offset reproduction.

Standard image size is 8-1/2 in. by 8-1/2 in. A unit that can produce 10-1/2 in. by 15 in. copies is available on special order.

The standard copier is furnished with an industrial grade nine-inch CRT monitor. The monitor accepts EIA standard video signals for 525-line black-and-white television systems. The unit is also available without the monitor.

The copier is priced at \$2,660 in the standard version. Without the built-in monitor, the unit is priced at \$1,980. Both versions are currently available on a 15-day delivery schedule.

A.B. Dick Co. is at 5700 W. Touhy Ave.

\$60/mo Bunker-Ramo 2210 CRT Terminal Has Numeric Keys, 200 Character Screen

STAMFORD, Conn. — The third member of Bunker-Ramo's 7200 series of CRT terminals is the lowest price unit in the family. The device rents for less than \$60/mo.

Called the BR-2210, the terminal features a 200-character CRT and block alphabetic and numeric keyboards.



Bunker-Ramo 2210 CRT

It is compatible, the company said, with the IBM 360, Burroughs B500, Honeywell Series 200, and Univac 490 and 1108 systems. Software compatibility is achieved with modifications supplied with the terminals.

The low price of the 2210, the company said, is a result of basing the display on the company's widely used Teletype III terminals.

The terminal is designed to be used either as a remote terminal or directly on-line to a computer. Transmission rates over telephone lines is at 2,400 bit/sec. On a direct wired system, data can be transmitted at speeds up to 55,000 bit/sec.

Operating features necessary for on-line data entry and retrieval have been incorporated. These include protected format, variable layout, tab, skip, dial, and conversational mode.

Thin-Film Circuit May Replace Mechanical Card Reader Sensors

PRINCETON, N.J. — A thin-film experimental circuit that could be used to replace at lower cost the mechanical or photocell sensors in punched card readers has been developed by RCA labs.

The circuit, laid out like a crossword puzzle, is a form of integrated circuit 5,000 times larger than the standard type, according to RCA. It is a flat array of 960 photosensitive elements, plus auxiliary components, and interconnections, deposited on a four-by-eight-inch plate of glass.

Because the array is an integrated circuit fabricated on a single substrate, RCA said, the circuit could be used in card readers that are smaller and less expensive than conventional units, many of which are assembled from large numbers of separate photocells.

In its present form, the circuit laid out as a computer card reader containing 960 photoconductive elements — 12 rows of 80 elements — that match the 860 positions on a computer card. Whenever a hole has been

punched in a card, the corresponding photoconductive element senses light and, in turn, provides an electronic signal.

The basic unit has a lease price of \$39/mo and a purchase price of \$850. A typical installation, the company said, consisting of a terminal and communications and control units, buffered and interfaced to a System 360, would rent for about \$55/mo.

First shipments are scheduled for December 1, 1970.

Portable Terminal Outputs Hard Copy

STAMFORD, Conn. — A low-priced portable communications terminal from Data Products Corp.'s Telecommunications Division produces hard-copy output.

Output of the PortaCom terminal is on 8-1/2 in. paper, in contrast with the strip printer that is used in other portable terminals.

In spite of the greater weight of the printing mechanism, the unit weighs less than 30 lbs, according to the company, and fits into an attache case.

The PortaCom, the company said, is currently being used in a variety of applications including

computer instruction, banking, sales, medical information systems, and engineering.

The printer produces up to three carbon copies using sprocket-fed paper. The unit has a built-in acoustic coupler that can transmit or receive at up to 300 bit/sec.

The terminal uses a standard 128-character ASCII keyboard and is Teletype-compatible. It is also designed to interface with tape cassettes through an EIA 22-pin connector.

The PortaCom leases for \$95/mo and sells for \$2,450. Quantity discounts are available. The unit is currently available on a 30-day delivery schedule.

The Telecommunications Division of Data Products Corp. is at 17 Arden Place.



PortaCom Terminal

Graphic Time-Share Plotter Works With Terminals

PALO ALTO, Calif. — Graphical output in conjunction with an IBM Communication Termi-

nal is obtained with a new graphical plotter from Hewlett-Packard. The Model 7201A is an absolute coordinate plotter that develops graphics by drawing vectors or plotting points.

Backup software or previous programming knowledge is not required for operation, the company said, and it accepts coded data at 14.8 char/sec.

IBM-Compatible

The plotter adds IBM terminal compatibility to the Hewlett-Packard graphic plotters. The 7200A accepts standard ASCII code at 10 char/sec.

An operator can input data or mathematical functions in source language on time share systems to produce charts, or graphs. Mnemonic code similar to those used in time share systems are used to instruct the

plotter.

All points are defined by absolute coordinates. Points to each plotted point is independent of the accuracy of preceding points. Improper data causes the pen to lift. Plotting is resumed automatically at the next properly formatted point.

Paper up to 11 by 17 inches is gripped by the Autogrip electrostatic paper hold-down. Front panel controls allow adjustment of graph limits to fit a plot to any preprinted grid. Several colors of ink are available in disposable pens.

The price of the HP Model 7201A Graphic Plotter is \$3,300. Rent/lease plans are available. Deliveries are scheduled to start in 8 months.



HP Model 7201A Graphic Time-Share Plotter

Cartrifile Tape Cartridge Transport Uses Revised Data Recording Format

MOUNTAIN VIEW, Calif. — An upgraded version of the Cartrifile magnetic tape cartridge transport for minicomputers uses a revised data recording format to increase cartridge capacity and to improve data transfer rates. The device can interface with minicomputers from DEC, Data General, and Hewlett-Packard.

Called the Model 4196, the unit features four tape loops, each with its own transport, that can hold over 3 million data bits. The system can hold more than 1-1/4 million 8-bit words when a 1,000 word record format is

used.

The four tape transports in the unit are independently controlled by circuitry that allows the computer to write data on one tape while reading from another. This capability, the company said, expands the minicomputer into a true data processing system that is able to sort, match, merge, and separate data, with only one Cartrifile required.

A transfer rate of 18,000 bit/sec enables the Cartrifile 4196 to transfer 16-bit computer words at a rate of 1,000/sec. The rate for 8-bit words is 1,800/sec.

The 4196 uses bi-track data format, a bit-serial, phase-encoded recording technique. The bi-track format uses only the two center tracks of the tape, which, the company said, eliminates the possibility of data errors due to edge-track damage.

The Cartrifile 4196 is available complete with interface circuitry and software for use with small computers such as the PDP-8, Nova, HP 2114, 2115, 2116, and others. Cabling and necessary electronics, are provided. The Cartrifile 4196 tape system is priced at \$6,050, fully equipped. It is currently avail-



Model 4196 Cartrifile Tape System

able on a 45-day delivery. Tri-Data Corp. is at 800 Maude Ave.

Improved Version of XDS Mini Features Faster Cycle Times

EL SEGUNDO, Calif. — XDS has unveiled an improved version of its CF16 mini.

Varying from its year-old predecessor in having a faster memory, the CF16A in other ways is compatible with its predecessor.

The use of more advanced technology enables the newer model to have a cycle time of 1.6 μ sec, as opposed to the 2.67 μ sec time of the older device.

Designed for applications in industrial, educational and aerospace environments, the 16-bit mini features a 126-instruction set, memory that can be expanded from 4K to 32K words, I/O transfer rates as high as 500K word/sec, and a variety of peripherals.

Software includes an assembler, basic Fortran compiler that can operate in 4K, utility and diagnostic programs, and a library of math routines.

Peripheral equipment available includes fixed-head disk storage, magnetic tape, punched card input, punched paper tape equipment, analog/digital converters, and communications interfaces.

A typical 8K CF16A configuration, according to XDS, with real-time clock, three levels of priority interrupt, memory and power protect, paper tape reader/punch controller, and teletypewriter will sell for approximately \$17,000. The first units are scheduled for delivery in November, 1970.

Varian Text-Setter Faster Than MT/ST

IRVINE, Calif. — Output of camera-ready text at the rate of 200 pages-per-hour — 20 times faster than presently used systems — is claimed for an automated text-setting system from Varian Data Machines.

Varian said the system, called Variset, cuts revision time 90% as compared with IBM MT/ST systems. Variset combines digital tape transports using Philips-type cassettes, a line printer to produce revised drafts, and a Varian 6201 minicomputer to automate all operations.

Typical Variset systems will lease from \$2,000 monthly, depending on configuration and number of terminals. Deliveries are scheduled for early next year.

Video Systems' Recorder Uses Philips Cassettes

PENNSAUKEN, N.J. — A cassette tape memory recorder from Video Systems Corp. is adaptable to any of the firm's CRT terminals.

Called the VST-Termicord, the recorder can be plugged directly into any of the Video Systems units. It is designed to use Philips-type C-60 cassettes.

Data is recorded and reproduced at 500 bit/sec. Packing density is 250 bit/in. Up to 850,000 bits can be stored on a cassette.

The Termicord is priced at \$1,695 and can be leased for \$85/mo on a one-year lease.

Video Systems Corp. is at 7300 N. Crescent Blvd.

New HARD COPY UNIT

Now, information from your computer is quickly copied for distribution to management and other personnel. These copies are ideal for printing and permanent records — and easy to select, insert, and remove. Of high quality, clear, and readable.

7300 GRAPHIC DISPLAY

See The Tektronix Display At FJCC

EverOn Supplies Power for Computer

SANTA ANA, Calif. — The EverOn Power Processing Unit, from Gates Learjet Corp., Static Power Division, "precludes brownouts" and their effects on

dp accessories

computers. The device regulates commercial electrical power.

The basic configuration can also supply a computer with power for up to five minutes. With extra batteries the unit can supply auxiliary power for a longer time.

The price of the basic unit is \$30,000. A five-year lease which includes maintenance is \$890/mo. Delivery is 120 days.

Gates Learjet Corp., Static Power Division, is at 2001 South Richey.

Systems Supply 1 Hr. Back-Up Power

WILLOUGHBY, Ohio — Five standard protection periods, ranging from one minute to one hour are available with various models of back-up power devices from Cyberex, Inc.

Called the Fourth Generation Static Interruptible AC Power Systems for Computers, the systems are available in 40 standard ratings from 10 to 120 KVA.

The price of the systems range from \$13,500 to \$102,000. Delivery is about five months, the company said.

Cyberex, Inc. is at 4399 Industrial Parkway.

700C System Can Use Diesel Generator

RICHMOND, Va. — A system from Power Systems and Controls, Inc. provides five minutes of continuous power after the normal supply has failed.

Called the Series 700C, the equipment is designed to prevent "brownouts."

A diesel-driven generator can be added to the system to provide continuous power in case of longer periods of failure.

The systems are priced from \$30,000 for a 40 KVA unit to \$500,000 for systems rated at 1,500 KVA.

Power Systems and Controls, Inc. is at 3206 Lanvale Ave.

"Energy Package" Can Be Leased

FAIRFIELD, N.J. — Atroyal Manufacturing Co. offers auxiliary power systems that can provide computer power for periods of time from 15 minutes to one hour.

For longer time periods, a diesel generator can be added to the Atroyal Continuous Energy

Package.

The smallest unit, rated at 10 KVA, is priced at \$30,000. The largest, with a rating of 500 KVA carries a price of \$500,000.

The units are available on a lease basis also. Atroyal Manufacturing is at 19 Gloria Lane.



Gates EverOn for 360/50



Cyberex System

INTERNATIONAL DATA CORPORATION

and its European affiliate

IDC EUROPA, LTD.

announce that they are currently conducting a study of the

European Data Capture Equipment Market

The results of this survey will for the first time provide accurate data on the data capture market throughout the major European market centers.

Requests for further information on this study should be sent to:



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CAMBRIDGE COMPUTER ASSOCIATES, INC.

OCR Handles High Volume Input, Punches Data Directly in Cards

PALO ALTO, Calif.—Installed for the user that processes a minimum of 9,000 invoices per day, an optical scanner from Data Recognition Corp. reads imprinted documents and punches the data into tab cards.

The Model 710, the company said, was developed for use in the bank credit card industry, the retail store trade, hospitals and the oil industry.

Capable of processing up to 6,000 documents per hour, the machine can be used to replace keypunching. It is a stand-alone device requiring no computer control.

The IBM device most nearly comparable to the Model 710, Data Recognition said, is the 1282 optical reader punch. Less

expensive, this IBM device reads only numeric data and three special characters from 51-column and 80-column cards and punches the data into the same cards at a maximum rate of 200 card/min.

The new device reads Farrington 7B font, commonly used in credit card and similar applications. Output is through a standard 100 card/min punch.

First deliveries are expected to be made in June, 1971.

The price of the Model 710 is expected to be about \$85,000.

Data Recognition is at 908 Industrial Ave.



Gerber System 1223

Gerber Digital Drafting System Includes Text Symbol Generator

SOUTH WINDSOR, Conn.—An all-digital drafting system, manufactured by Gerber Scientific Instrument Co., uses a Hewlett-Packard mini as a control device.

The System 1223 has a wide range of capabilities, the company said, permitting the conversion of all types of data into graphic form.

The system is said to be suited for both office and field use. It consists of a general purpose Model 1200 stored program control, an interface for matching the computer output to the Series 23 drafting table, computer peripheral devices for data transfer, and software for directing operation of the system.

An additional feature is a symbol generator which utilizes

core-stored alphanumeric text symbols and allows full rotation of text messages, Gerber said.

The system features a 400-char/sec punched paper tape bi-directional reader, a 10-1/2-in. spooler, and a standard 110 teletypewriter for manual input and operator message output. Magnetic tape input is also available as an option.

It has applications in such areas as space vehicle tracking, intelligence data display, map making, statistical analysis, logic diagrams, schematics, logistics, and aircraft and missile design.

The System 1223, in its basic configuration, is priced at \$40,000. It is available on a three to four month schedule.

Gerber Scientific Instrument Co. is at 83 Gerber Rd.

According to our calculations, there are 12 reasons why you should visit Booth 3516 at the FJCC.

Here they are:

- New Gould 4800T Programmed Remote Printing Terminal — remote batch printing terminal with extensive on-line and off-line printing capabilities.
- New Stand-Alone Printer/Plotter System — on-line to a minicomputer.
- New IBM-Compatible Off-Line Printer/Plotter System — makes hard copies of alphanumerics and/or graphics at page-per-second rates.
- New Brush 1100 Graphic Plotter — a high performance digital X-Y plotter for remote time sharing computer terminals.
- New Gould Memory Discs — disc manufacturing and measuring.
- New 11" Wide Printer/Plotter — prints in 132 columns.
- New Program Controlled Paper Cutter/Stacker.
- New Low Cost Matte Paper, In-House Paper Coating.
- New Hardware and Software Character Generators — a

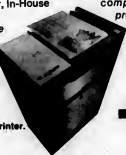
new software package permits computer generation of standard or non-standard characters, symbols, etc.

- New Hardware and Software Interfaces — permit on-line printing from major mainframe computers such as IBM 360; DEC PDP/8's, 12's, 15's; Interdata; Burroughs; Univac 1108; Varian, etc.

• New Software Packages for Graphics — Mainframe-compatible plotter Conversion, Quick Draw, and Design software packages now available from Gould.

- New Test Boxes for Printer/Plotter Electronics.

We're looking forward to seeing you at the FJCC November 17 thru 19 — Booth 3516. Ask us about our new prices and pricing policy. And if you can't make the Conference, write for complete details on our new products. Graphics Division, Gould Inc., 3631 Perkins Ave., Cleveland, O. 44114.



One of the reasons:
The Gould 4800 Electrostatic Printer.

 **GOULD**

Printer and Card Reader Added to Qantel System

HAYWARD, Calif.—A medium speed line printer and a compact card reader have been introduced for use with the Qantel V business computer by Qantel Corp.

The line printer will handle Qantel V data at the rate of 200 line/min. It will sell for \$11,500 outright or lease for \$355 a month including maintenance.

The card reader is fully buffered and will read standard 80-column width hole-punched cards. It translates data into Ascii code. The price of the card reader is \$3,950. It will lease for \$122 a month including maintenance.

The Qantel V system is a business accounting center which can also operate as an intelligent terminal in a computer network environment. The addition of the new printer and card reader are said to add flexibility and usefulness to the system.

Qantel is at 3474 Investment Blvd.

Channel Allows PDP-11 To Use PDP-11 Front-End

BEDFORD, Mass.—A device that allows a DEC PDP-11 mini to be used as a front-end processor for the PDP-10 time-sharing system has been developed by Bedford Associates, Inc.

Called the Data Channel, the unit provides bi-directional programmed data transfers between the 16-bit PDP-11 and the 36-bit PDP-10.

According to the company, the device could find use in such applications as communications processing and data concentration. It could, for example, be used to set up an automatic data gathering system in manufacturing plants to process data for an MIS.

Transfer rate for 16-bit words is 850K bit/sec, while 32 or 36 bit words can be transferred at 1,500K bit/sec.

The channel is so designed, the company said, that the PDP-10 controls the operation of the PDP-11. The PDP-11 can request data to be transferred, however.

The device offers program selection of the following transfer modes: interrupt, non-interrupt, and half-word (16 bits). A display panel provides read-out of channel status.

The Data Channel is priced at \$9,800. It is currently available on a 30-day delivery schedule.

Bedford Associates is at 75 Wiggins Ave.

Tape Handling

HOUSTON—A punched paper tape handling system has been introduced by Houston Scientific Industries, Inc.

The system, known as the Autotape-3, is designed to be mounted directly on the ASR-33 Teletype.

The company is at 4202 Directors Row.

AT & T Calls Johnson Biased, Asks Disqualification

By Don Levitt

CW Staff Writer

NEW YORK — American Telephone and Telegraph Company has asked Federal Communications Commission Chairman Nicholas Johnson to disqualify himself from participating in FCC matters involving Bell System companies.

In a "petition for disqualification"

addressed to the Commission, AT&T characterized remarks Johnson made on Oct. 19

Communications

in Chicago as demonstrating "a deep-seated bias and prejudice against the Bell System."

The Johnson speech, delivered at the DigiTronic User's Association meeting, [CW, Oct. 28] was subtitled "For Whom Does Bell Talk?" During the talk, Johnson commented that "Bell management has been urging policies that don't even serve the company's interest."

"Not atypical of a basic AT&T failing," Johnson said, is the situation in New York which "serves to illustrate the long lead times in the AT&T system. Lower cost planned expansion was replaced by high cost crash programs. Many customers were unserved."

"He said, that in the past few years, 'we have seen an increasing erosion of the privacy and integrity of the telephone system.' He added that Bell had 'no strong opposition' to wire-

tapping, and said that in fact he had heard reports of "local company cooperation with all types of communications interception."

He also cited TD 2 microwave as an example of Bell's lack of technological supremacy. "Competitors," he said, "had jumped ahead in developing this particular type of microwave. Bell had to make a crash effort to catch up. Whether this crash effort would have been successful without Bell's basic monopoly advantages of FCC protection of Bell-maintained barriers to competitive entry cannot be determined," he said.

Later he noted that "some of the most disheartening and fascinating of Bell's management errors" involve the telephone service itself.

AT&T said that the specific accusations and charges Johnson made in his speech were without merit and factually unsupported. The fact that he volunteered the charges in a public speech, the company said, is entirely incompatible with the dispassionate objectivity required of his high office as a public regulatory official.

"Many of the issues raised by Johnson, the company said, are now pending before the FCC in proceedings in which Bell System companies are entitled by law to an impartial and objective determination."

Reacting to the AT&T petition, Johnson said that he will consider it "most seriously" and admitted "it is understandable why Bell management would want to silence me."

Bell Admits Demand, Says It Can Meet Data Needs

By Ronald A. Frank

CW Technical News Editor

NEW YORK — Acknowledging an ever increasing demand on the part of computer data users for improved communications facilities, AT&T officials said last week that the Bell System could best meet those needs.

Appearing at a special session held here and transmitted via closed circuit TV to Washington and Chicago, were Richard Hough, president of AT&T Long Lines, Kenneth McKay, vice-president for Engineering, and Samuel Bonsack, vice-president for marketing and services.

Bonsack said that current Bell estimates indicate a total data market worth two billion dollars by 1980. He cautioned, however, that the "demand for data will not outstrip voice [facilities] demand by the end of the 70s."

When asked whether AT&T considered specialized carriers such as MCI, and potentially Datran, as competitors, Bonsack said these type of firms were not yet providing data users with services.

New Hearings Needed

Asked whether Bell would compete when the new carriers began operating, Bonsack said that it must first be proven whether the new carriers "are in the public interest." He called for a new set of hearings by the FCC to determine "the public need." He added that AT&T would "compete aggressively" in the field of data communications with any new carrier.

On the question of price averaging whereby Bell spreads network costs evenly over its entire network, Bonsack said that if the new carriers offer data rates lower than AT&T on the more densely used routes Bell would have to react.

Pressed on this issue he said that AT&T would have to consider lowering its rates on the routes where it had competition. He predicted that such selective lowering of rates could quite possibly result in rate increases on less densely used routes throughout the Bell System. He added that speculation about such modifications in Bell's pricing policies was still premature.

McKay said that today the "average data phone is operating at 2,000 bit/sec and experiencing an error rate of 5 bits in every 10 million bits transmitted."

DAA Maintenance Is Vital

Discussing the interconnection of non-Bell equipment to the phone system, McKay told CW that AT&T would sanction the incorporation of DAA devices within non-Bell equipment only if Bell were able to retain responsibility for the maintenance of the devices.

Speaking of future methods of data transmission, Hough predicted that waveguides would be in use on the Bell System by the late 70s and laser-controlled fiber optic pipes were a possibility for the early 80s.

Penril Unit Can Replace Bell 101C
SILVER SPRING, Md. — The TSY-300 modem designed for installation within a Model 33 Teletype, is a replacement for the Bell 101C, and is available from Penril Data Communications Inc., 960 Thompson Ave., here.

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Technical Sessions Stress Systems Aspect of Theme

HOUSTON—Four-and-twenty subjects, and then some, will be discussed during the technical sessions at next week's Fall Joint Computer Conference here. Most deal with systems, generally, but few talk about the latter part of the slogan "Systems and Society."

With no sessions to compete with H. Ross Perot's keynote address, the opening technical meetings will be at 12:30 Tuesday afternoon. In most cases conflicting meetings do not overlap in discipline or probable interests of attendees.

The Tuesday sessions deal with programming, memory systems, and design, and, as is the case with all other technical meetings, will be held in the Astroturf. The session numbers precede the times.

Session 1 is entitled, "A Spectrum of Programming Languages." Panel topics include ways of circumventing problems discovered in traditional programming practice.

2 - 12:30-2:30 - "Three State-of-the-

Art Memory Systems." Topics are Cache Memory Design, a large MOS/FET Memory, and an on-line mass storage system.

3 - 12:30-2:45 - "Design for Reliability." Papers deal with methods of testing "the newer computer logic [which] is becoming more difficult to test because of added complexity, pin limitations, different failure modes, and newer wear-out phenomena."

4 - 3:15-5:30 - "Operating Systems and Schedules." A panel will review system performance in light of scheduling and allocation strategies, system tuning, and system monitoring.

5 - 3:55-5:30 - "Aerospace Applications," presenting computational devices or techniques in the "typical aerospace industry simulation facility."

6 - 3:15-4:45 - "Survey of Computer Procurement in Research and Development Techniques." Overview of R&D requirements, plus a detailed look at computer contracts.

Wednesday Morning

7 - 8:30-9:30 - "Multi-Access Operating Systems." Describes two relatively small computers which "take on the functional characteristics of much larger machines" when attacking the general-purpose software problem.

8 - 8:30-10:30 - "Analysis of Information Retrieval Systems." Analysis at three possible levels, and the question of protection of information in a resource-sharing environment.

9 - 8:15-10:15 - "Computer-Aided Undergraduate Instruction." Thesis: The educational process is substantially enhanced by these methods implemented on computers.

10 - 10:15-11:30 - "Computer Communications, a Bureaucratic Industry, Part I" (Part II is Session 12, after lunch). Establishing computer networks; selection of facilities; based on trade-offs; implementation of computer-controlled

communication networks, hardware and software; interconnecting.

11 - 10:45-12:15 - "Computer-Aided Design." Systems to organize design-aided software and promote its efficient utilization, and an interactive graphics language to assist engineering design.

12 - 10:30-noon - "Interfacing Computers and Education." Following formal presentation of papers, authors review their experiences and reactions in this interdisciplinary field.

Wednesday P.M. Sessions

13 - 2:45-3:30 - "Computer Communications, Part II," panel discussion.

14 - 1-3 - "Time-Sharing Systems." Addresses the use and philosophy of T/S, plus terminals, applications, dedicated systems. Includes panel discussion.

15 - 1:33 - "Hybrid Systems." Three papers discuss multiprogramming; the Digital Differential Analyzer, and electronic patching, showing the programming of a complex problem.

16 - 3:30-5:30 - "Simulation Languages and Systems." Three papers, each on a specific language, plus one on simulating traffic control, and the fifth presentation of simulating voice processing.

17 - 3:30-5 - "Art, Vice and Games." The use of computers in "unusual and exotic applications," including music, sculpture, bridge, even crime.

Thursday Morning Sessions

18 - 8:15-9:15 - "Computers and Manufacturing." Two presentations, one dealing with IBM's ideas on process control, the other with testing Western Electric's manufacturing line. Emphasis on real-time speed, test sophistication, and equipment efficiency.

19 - 8:15-9:45 - "Automata and Switching." Statistical control theory and formal automata theory, as applied to controlling the generation and transmission of data.

20 - 8:15-9:45 - "Computations: Efficiency and Performance." Relating costs to accuracy; also disclosure of an efficient technique for analyzing program running time.

21 - 9:30-11:30 - "Long Range Goals of Programming Languages," a panel discussion. Three approaches are reviewed formally: universal language, application-oriented language, and extensible language. Relevant research problems are discussed.

22 - 10:1-1:30 - "The Effects of Government Requirements on the Computer Industry," or the Government as a customer. Panel discussion, featuring Rep. Jack "Brooks Bill" Brooks, Dr. H.R.J. Grosch, and Joseph F. Cunningham, Office of Management and Budget, as well as representatives of computer industry and user groups.

23 - 10:1-1:30 - "Time-Shared Text and Information Handling." The use of the computer for quick response to human information and text-handling needs.

After Thursday Luncheon

24 - 2-5 - "Communications and On-Line Systems." A survey of evolving problems, examination of new applications, and disclosure of hardware and software developments satisfying real-time demands.

25 - 2-4 - "Selected Computer System Architectures." Three contributions to the idea that computer costs and complexity can be decreased by representing certain concepts and structure in hardware.

26 - 3:30-4 - "Prospects for Analog-Hybrid Computing." Some predictions on applications, technology, a "tutorial" review, all followed by panel discussion.

The day-and-a-half sessions entitled "Broad Perspectives" are described with other news of the conference. They will be presented during most of the sessions on Tuesday and Wednesday.

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ACM, Other Interested Groups Plan Adjunct Meetings

HOUSTON — Scores of "adjunct meetings" will surround the main event next week, when the fall computer carnival gets under way at the Astrohall.

The parent group, the American Federation of Information Processing Societies (AFIPS), sponsors the conference itself, and several of the constituent societies hold annual, semiannual, or special meetings in the meantime.

The Association for Computing Machinery (ACM), generally regarded as the senior U.S. society, will hold the most meetings, running from Saturday through Friday.

The Special Interest Group on File Description and Translation (SigFile) will conduct a workshop on data description and access Saturday and Sunday, 9 a.m. to 5 p.m. at Rice University. Sunday, in Room A in the Astrohall, the Special Interest Group on Computer Graphics (SigGraph), will hold a dinner meeting from 6:30-8:30 p.m.

And Now We Join . . . In Progress

Other activities are listed below, with the exception of some meetings for internal ACM purposes (editors of the group's various publications, or chapter chairmen). Some meetings with meals require prior arrangements, but are nonetheless listed for general information.

All ACM meetings will be in the Marriott Motor Hotel unless otherwise indicated, and room designations precede the time. The phrase "Special Interest" has been omitted in group/committee listings.

Monday, Nov. 16

Computer Science Education (SigCSE), Astroworld Ballroom, A, B, 8 a.m.-10 p.m.

Computer Graphics (SigGraph) workshop, lunch, A, B, C, E, 9 a.m.-5 p.m. ACM Standards Committee, Rough Rider, 2-7 p.m.

Computer Systems Installation (SigCosim), Audience participation encouraged. Business meeting, planning, 4, 8-11 p.m.

Tuesday, Nov. 17

Computers and Physically Handicapped (SigAph), D, 7:30-10:30 p.m.

Computer Personnel Research (SigCar) review of accomplishments, open discussion, F, 8-11 p.m.

Programming Languages (SigPlan), B, 8 p.m.-midnight.

Wednesday, Nov. 18

Business Data Processing (SigBdp) "Centralization/Decentralization Issue" Meeting, breakfast, D, 7:30-9:30 a.m.

Biomedical Computing (SigBio), E, 4-5 p.m.

Joint Users Group (Jug), Mustang, 4-8 p.m.

University Computing Center (SigUCC), Panel on resource allocations in university computing centers, S. Chapparral, 5-8 p.m.

Operating Systems (SigOps), B, 8-10 p.m.

Language Analysis and Studies in the Humanities (SigLash), Applications in archeology and anthropology, C, 8-11 p.m. Artificial Intelligence (SigArt), F, 8-11 p.m.

Computer Uses in Education (SigCae), Review of ACM '70 Convention, as regards increasing the role of computers in instruction, Panel discussion, S. Chapparral, 8-11 p.m.

Computers and Society (SigCas) (Jointly sponsored with IEEE and AFIPS). All technical speakers have been invited to sit as a panel in this session, E, 8 p.m.-midnight.

Thursday, Nov. 19

SigBio, continued, F, 8-10 a.m. SigBio, continued, Rough Rider, 1-3 p.m.

ACM Council, E, 8-11 p.m.

Friday, Nov. 20

ACM Council, D, 9 a.m.-5 p.m.

Systems, Other Societies

The Computer Group of the Institute of Electrical and Electronics Engineers also conducts meetings throughout the joint computer conferences, in addition to other regular get-togethers. The IEEE meetings will all be held at the Shamrock Hilton Hotel.

Monday, Nov. 16

Peripheral Equipment (Technical Committee), Belvedere, 9:30 a.m.-5 p.m. Fault Tolerant Computing (Technical Committee) Venetian, 8-11 p.m.

Tuesday, Nov. 17

(All Meetings Sponsored by Technical Committee.) Computers and Communications, Castilian A, 8 a.m.-5 p.m.

Computer Elements, Castilian C, 8 a.m.-5 p.m.

Computer Architecture, Nile, 9 a.m.-noon.

Applications in Management Data, Venetian, 1-3 p.m. Computer Communications Systems, Belvedere, 1-5 p.m.

Wednesday, Nov. 18

Fellows Committee, Nile, 7:30-11:30 a.m.

Pattern Recognition (Tech. Committee) Castilian A, 9 a.m.-5 p.m.

Midwest Area Committee, Castilian C, 10 a.m.-noon.

Social Implications of Computer Committee, Venetian, 5:30-7:30 p.m.

Thursday, Nov. 19

(Mostly committee meetings, in preparation for the administrative meeting on Friday.) At 9 a.m. Thursday, the following IEEE Computer Group committees will meet, in various rooms: conference and meetings, editorial, technical activities, and membership. At 2 p.m. the executive committee will meet, scheduled to ad-

journal at 10 p.m.

Friday, Nov. 20

Administrative committee, meeting with luncheon, Belvedere, 9 a.m.-5 p.m.

In addition to the numerous meetings listed above, at least two other constituent groups will conduct business during the conference.

The Society for Information Display will hold its Executive Committee Meeting at the Astroworld Hotel Wednesday afternoon, and the board of directors meeting all day Thursday, also at the Astroworld.

(Concluding the week's activities for Simulation Councils, Inc. (SCI) will be the Fall National SCI meeting, from 9 a.m. to 3 p.m. at the Shamrock Hilton Hotel. One panel will discuss "Trends in Simulation Computer Hardware," and a second will address the topic of "Trends in Simulations in the Public Interest."

The meeting will include a luncheon.

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Many Fine Restaurants on Houston Gastronomy Tour

HOUSTON - The nation's sixth largest city boasts the Manned Spacecraft Center, the "Astrodome," several cultural events, and scores of excellent dining places.

There are over sixty member restaurants recommended by the Greater Houston Convention and Visitors Council. CW lists several which are located nearest the convention center. Comments by the American Automobile Association follow the general descriptions of restaurants.

The Astrodome, situated on Kirby St., is the start of all Houston journeys for conference attendees. Heading North on Kirby, there are at least three hotels within sight, all with dining rooms.

As is the case with other restaurants, membership in the "private clubs of Houston" is necessary to partake of alcoholic beverages, where they are offered.

★ First is the *Astroworld*, site of the keynote address. It features three distinct

dining facilities, with champagne dinners and gourmet food, plus a bar. Entertainment is provided in the upper club.

Hours: Coffee Shop, around the clock. Dining Room, 11 a.m. to 11 p.m. Supper Club, 6 p.m. to midnight, to 1 a.m. Sat. Bar, 11:30 a.m. until midnight, until 1 a.m. Sat. (AAA: "Very good") 748-3221.

★ Holiday Inn-Astroworld: *Rubens Club* features entertainment nightly. Dining Room open 6 a.m. to 7 p.m., 7 days (AAA: "Very good"), 748-1050.

★ Sheraton Inn-Astroworld: two distinct dining facilities, featuring American and Continental cuisine, plus private club with "colorful Texas rodeo atmosphere."

Hours: 11 a.m. to 11 p.m. Supper Club, 6 p.m. to midnight, to 1 a.m. Sat. (AAA: "Very good"), 748-3435.

★ Proceeding North on Kirby St., there is a *Steak 'N' Ale* at 1104 Old Spanish

Trail. This Old English Inn features the "choicest aged beef" served by costumed college students in a rustic atmosphere complete with fireplace, 665-7566. Open from 6:30-11 p.m. Sun-Thurs., and until midnight Fri. and Sat.

★ Further North on Kirby St., on the corner of South Main, is one of two "El Chico International" restaurants, featuring foods of Italy, France, Mexico, and the U.S. The club advertises "popular prices" for dining, and also has a "Vaquero Club" which has dining and entertainment. Hours: 11 a.m.-midnight, until 1 a.m. Sat., 666-2288.

"Gastronomical Alley" appears when one turns left onto Main Street, Facing South, there are nine restaurants, some located in hotels, between here and the south loop of the Route 610 beltway.

★ First is *Kaphan's*, which calls itself the "sartorialist" of seafood and steaks. It features the *Charcoal Garden* for dining, and *Club Kaphan's* for cocktails, and is

located at the corner of Kirby St.

Closed Wednesday, Kaphan's is open 11 a.m. on Sunday, and 11 a.m. to 11:30 p.m. other days. (AAA: "wide variety of very well prepared food... attractive dining area"), 668-0491.

South on Main Street

★ *Surrey House Motor Hotel* features the *Golden Horseshoe* private club, open from 4 p.m. until "curfew": (AAA: "Good"), 667-9261.

★ *Galdo's Restaurant* features seafood and steak, dress is casual. Open for lunch at 11:30, then again at 5 p.m. Closed Monday, 668-4444.

★ There are perhaps twenty *Dobbs House* snack bars open around the clock, and are spaced over the entire area. One is diagonally across the street from Galdo's.

★ Back on the West side of South Main St. is the *White House Motor Hotel* and Restaurant which features "good American cooking with Italian specialties on request." Hours: 6 a.m. to midnight, except until 10 p.m. Sundays, 666-2261.

★ The *Twenty-Nine Palms* Coffee Shop is in the motel of the same name, and is open for breakfast only, plus sandwiches and hamburgers until 2:30 p.m. Closed Sundays, 668-0691.

★ *Las Vegas Motor Hotel* features the *Ford Lot Restaurant* serving U.S. Choice Steak and fresh seafood, hot lunches daily. Open 6:30 a.m. to 10:30 p.m. seven days. The "private club" closes at 2 a.m., opening at 10 a.m. every day but Sunday, when it opens at noon.

★ *Ramada-Domed Stadium* "Breakfast, luncheon and gourmet dinner" served in an Early American dining room. The private *Locker Room* has occasional entertainment. Hours: 6:30 a.m. to 9 p.m. (AAA: "Very good"), 666-4951.

★ In the "magic circle" at Route 610 is *Look's Sir-Loin House*, which boasts of being "home of the 'Knight on the White Charger.'" Prime and choice steaks, prime ribs, club facility. Lunch 11:30 a.m. - 2 p.m. Mon-Fri. Dinner 5:11-30 p.m. (AAA: "Very popular... Old-English style"), 782-1520.

'Out of the Way!'

★ For something a little out of the way, continue south on South Main, turn right on Stella St., then right again on Franklin where, on the corner of Milam Street, is the *Restaurant Bismark* which includes the *Magnolia Club*. Lunch 11:30-2:30. Dinner 6:30-midnight. Closed Sunday, 227-4168.

Continuing the tour, return to the corner of Kirby and S. Main, go a little North on Main, until S. Braeswood St.

★ To the East (right) is the Marriott, which has the *Fairfield Inn*, a family restaurant in warm Spanish and Western decor, moderate prices, open around the clock, seven days, and *Club Sinton* and *Saddle*, gourmet dining, dancing, live entertainment. 11 a.m. to 2 a.m. Mon-Fri. 5 p.m.-2 a.m. Sat., and 5 p.m.-midnight Sunday. (AAA: "Excellent"), 747-6200.

★ To the left (West) on S. Braeswood is the *Shamrock Hilton*. Relaxed dining in the *Pavilion Room* and *Charcoal Terrace*, overlooking the pool. Texas-size steaks and diversified menu of delicious entrees. *Trader Vic's Restaurant & Private Club* features exotic Polynesian foods. *Pavilion Room* and *Charcoal Terrace* open for all three meals. *Trader Vic's* for lunch and dinner (AAA: "Very Good"), 747-6211.

★ Going East (right) on S. Braeswood, turn left on Fannin to find *Per 21*, boasting the "world's finest seafood," including Maine lobster (home away from home for New Englanders), plus fine steaks and chicken. The *Pier* specializes in Gulf seafood, and dress is casual. Open 11:30 a.m. to 11 p.m. except 10 p.m. Sunday, 747-5211.

Most of the "Western cut" steak houses are located in the downtown area and are not listed here.

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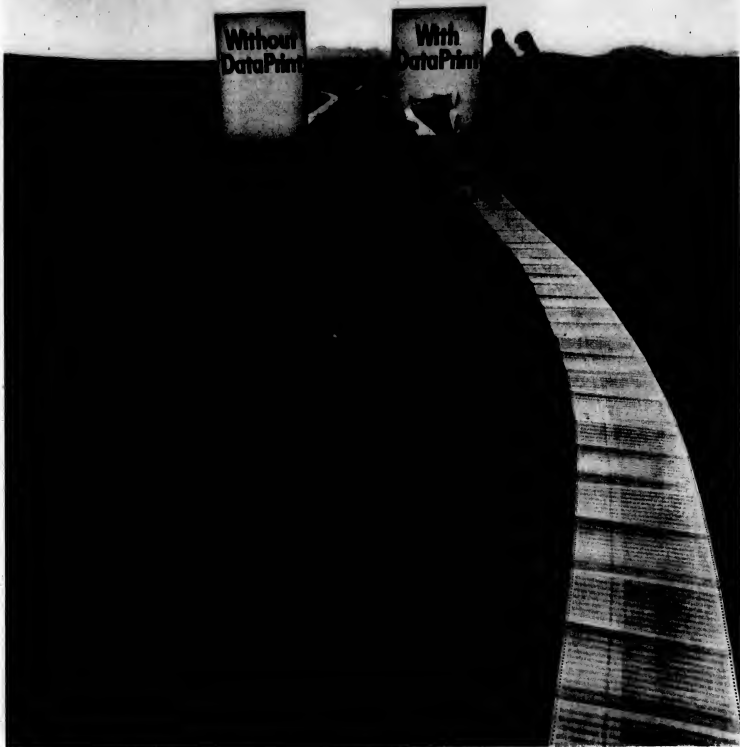
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CMC

Computer Machinery Corporation

International Epicurean Delights Houston Highlights

HOUSTON — The host city for the Fall Joint Computer Conference provides scores of interesting eating places, including several specializing in international food.

Following is a list of those members of the Convention and Visitors Council which offer such a bill of fare. The list is compiled alphabetically by country. Most restaurants also serve top quality American cuisine.

★ Argentine: Mama Puch's, 311 Travis (in Old Market Square), 224-4889.

★ Austrian: Restaurant Bismark, 719 Franklin, at Milam (in Old Market Square area), 227-4168.

★ Chinese: Timmy Chan Restaurant, 2606 Fannin, 225-0679.
★ Creole: Chez Orleans, 4088 Westheimer, 622-6747; Ravin Cajun, 1710 Richmond, 528-9935.

★ East Indian: The Safari Restaurant & Club, 4902 Richmond Ave., 621-4900.

★ English: Cheshire Cheese Room in the Sheraton-Lincoln Hotel, 777 Polk Street, 224-9041; Look's Sir-Loin Restaurants, 6112 Westheimer, 782-1520, and 9810 Main St., 666-4181; White Horse Cellar, 1211 Fannin, 222-2319.

★ French: Brennan's, 3300 Smith & Stuart, 523-0711; Cavillo Restaurant & Club, 1617

Fannin — 9th floor, 224-1755; Foundry at the River Oaks, 3435 Westheimer (River Oaks apt. bldg.), 622-7891; Maxim's Restaurant Francaise, 802 Lamar, 227-0695; Tony's Restaurant & Club, 2617 Sage at Westheimer, 622-6778.

★ German: Restaurant Bismark, 719 Franklin, at Milam (in Old Market Square area), 227-4168.

★ Greek: Athens Bar & Grill, 8037 Clinton Drive — near Fort of Houston, 676-1644; Parthenon Restaurant & Club, 611 Fannin, 227-8828.

★ International (general): Restaurant Cellini, corner of Stuart and Louisiana, 524-8007; Charley's 517, 517 Louisiana, across from Alley Theatre and Jones Hall, 274-4438; El Chico International restaurants, 239 Sharpstown Center, 774-9889, and 7707 South Main St., 666-2288; Los Troncos, 1516 Westheimer, 528-8684; Rib Room at the Hotel Sonesta, corner Smith & Jefferson, Culter Center, 227-6464.

★ Italian: Del Monico Spaghetti House, 3925 Westheimer Road, 622-5553; Joe DiMag-

gio's, 3795 Richmond Ave., 623-4233; Tony's Restaurant & Club, 2617 Sage at Westheimer, 622-6778.

★ Japanese: Tokyo Gardens Restaurant, 4701 Westheimer, 622-7886.

★ Jewish: Alfred's, 9123 Stella Link, 667-6541; 2408 Rice Blvd., 529-2891; and 520 Town & Country — home of the Alpine Club, 464-5411.

★ Mexican: El Chico Restaurants, 239 Sharpstown Center, 774-9889, and 7707 South Main St., 666-2288; Molina's Mexico City Restaurant, 4006 Main,

528-8619; Rancho Alegre Resort Motel, Gulf Freeway at Dickinson-Alvin Exit, 1-534-2571.

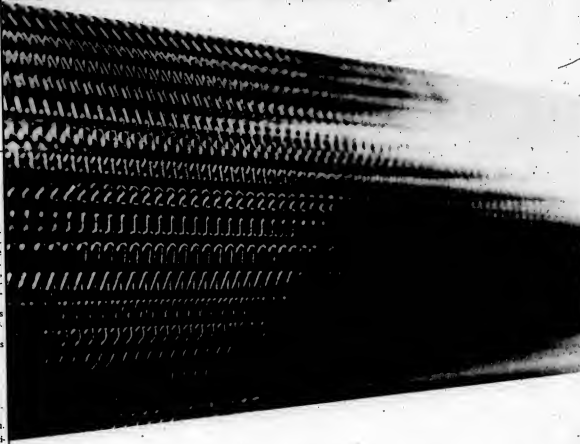
★ Middle Eastern: Phoenicia Restaurant & Club, 4326 Richmond Ave., 622-6780.

★ Polynesian: Trader Vic's Restaurant & Private Club, in the Shamrock Hilton Hotel, Main St. at Holcombe, 668-9211.

★ Spanish: Castillo Restaurant & Club, 1617 Fannin — 9th floor, 224-1755.

★ Swiss: Swiss Chalet Restaurant & Club, 511 South Post Oak Lane, 621-3333.

New Drum Printer delivers 1800 lines a minute



Afips Lists Fees And Registration Times for Joint

HOUSTON — Afips has announced the following registration fees and schedules for the Fall Joint Computer Conference. Fees for members of ACM, IEEE, SCI, SID and other constituent societies are \$20, including Conference Proceedings.

The charge for non members is \$40, which includes Proceedings. Full-time students pay \$5. Texas Barbecue/reception costs \$8; luncheon: \$7.50.

Registration Schedule

Conference site (Astrohall) — Mon., Nov. 16: 6-10 p.m.
Tues., Nov. 17: 8 a.m. - 10 p.m.
Wed., Nov. 18: 8 a.m. - 7 p.m.
Thurs., Nov. 19: 8 a.m. - 5 p.m.

Hotel Registration sites (Holt-Ida/Astroworld, Marriott, Rice, Shamrock Hilton) —

Mon., Nov. 16: 5-9 p.m.
Tues., Nov. 17: 8 a.m. - noon

Houston Intercontinental Airport —

Mon., Nov. 16: noon to 9 p.m.
Tues., Nov. 17: 8 a.m. - noon

Proceedings Copies Available to Those Not Attending FJCC

MONTVALE, N.J. — Persons unable to attend the Fall Joint Computer Conference will be able to procure a copy of the Proceedings, according to the conference sponsors.

The cost to members of Afips' constituent societies is \$13 for the hard-bound printing of the technical papers. Nonmembers pay exactly double.

You'll get delivery the first of the year.

That's the real news. Quality EDP printing at this speed is certainly important. But actual delivery in just four months gives you the competitive edge now. The new 2470 Line Printer delivers up to 1800 lpm on a standard 132-column format. You'll get crisp straight printout because the 2470 is built around our exclusive one-piece Mark IV hammer. And it's built by the people who've perfected the drum printer. Simple design and conservative packaging mean over 1500 hours MTBF and one hour per month preventive

maintenance. Other features include up to 6 clear copies, and quality OCR printing at reduced speeds. The prices good news also. Less than \$13,000 in OEM quantities. You don't have to wait for the others to catch up. Get delivery on the fastest drum printer on the market by calling our nearest sales office.



DATA PRODUCTS

OEM marketing 16055 Ventura Blvd., Suite 419, Encino, California 91436

Atlanta, Georgia (404) 881-0801; Baltimore, Maryland (301) 961-3737; Cherry Hill, New Jersey (609) 683-7088; Dallas, Texas (214) 371-5545; Detroit, Michigan (313) 354-4885; Los Angeles, California (213) 461-0801; San Francisco, California (415) 761-6101; Houston, Texas (713) 761-6101; London, England (01-772) 2871; Toronto, Ontario (416) 491-4885; Los Angeles, California (213) 461-0801; Baltimore, Maryland (301) 726-0725; Minneapolis, Minnesota (612) 831-6101; New York, New York (212) 611-6101; San Jose, California (415) 281-4885; Los Angeles, California (213) 461-0801.

See us at Booth #1014 FJCC.

Digital Scientific



**With our
90-nanosecond ROM
you will emulate
the big ones bit by bit!**

See us in Houston
Booth 1527, FJCC - November 17, 18, 19

Our ROM is so fast that you can emulate all operations of a computer, including input/output operations.

If you have IBM 1130 or 1800 computer programs, then the META 4* can be used with microprogrammed emulations in ROM which allow it to *use your existing programs at greater speed and at less expense.*

With inexpensive ROM options, firmware floating-point capabilities perform many tens of times faster than other computers. META 4's capabilities are *not* restricted to IBM 1130/1800 applications. Other computer instruction sets can be emulated.

If your requirement is communications, ROM contents are tailored quickly and easily to allow the META 4 to handle your data communications job more efficiently than any other device.

If you need a special, fast, disc file controller, ROM programs operate the file, do address and data format conversion, and interface to your data processing system—all at low cost and high speed.

The Digital Scientific META 4 saves time while doing all of the things it does best for you... solving your problems.

META 4 is a flexible, logical processor controlled by its Read-Only Memory (ROM) so that you can make it into:

- a computer ■ a communications controller
- an FFT processor ■ a COBOL or ALGOL machine
- or a FORTRAN engine.

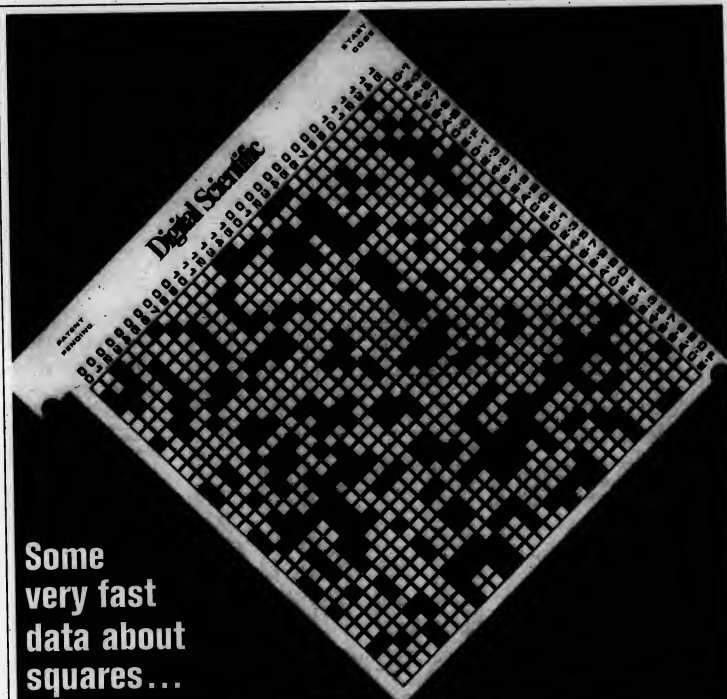
ROM firmware is custom tailored to turn META 4 into all of the things it does not, at first glance, appear to be. Firmware is the control memory program that executes at *less than 90 nanoseconds per step*. Microprogrammed firmware isn't unique, *but the way it is handled in META 4 is*. META 4 control memory contents can be modified to suit your microprogram—modified by *you at your desk* if you can't wait for us.

META 4 will process your special instruction sets.
META 4 will process other computers' instruction sets.
META 4 becomes the tool *you* want it to be—
and META 4 is FAST!

*META 4, Trade Mark

Offices Coast to Coast
DIGITAL SCIENTIFIC CORPORATION
11455 Sorrento Valley Road, San Diego, California 92121
Telephone (714) 453-8050

Digital Scientific



**Some
very fast
data about
squares...**

Digital Scientific

The above illustration is a pattern board from our high-speed (35-nanosecond access) Read-Only Memory (ROM) that controls the Digital Scientific META 4[®] Computer System. ROM contains thirty-two 32-bit instructions in a very powerful format.

* Trade Mark

You microprogram this ROM like software... and, with Digital Scientific's assembler and simulator, debug your codes. The final pass of the assembler generates a ROM pattern; then, pattern boards can be prepared by us or by you at your facility. Best of all, you can alter code and make changes, easily and simply, also at your facility.

The "big boys" have used "micrologic," but they cannot make this feature available to you... depriving you of a valuable new applications tool for your data processing system.

This capability, plus a flexible off-the-shelf group of hardware components, makes it possible for Digital Scientific to do a microprogrammed emulation of another computer (such as the IBM 1130/1800 to date). META 4 can be a high-speed peripheral controller or it can do communications (either as a replacement for the IBM 2703 or as a full-scale front-end communications system). META 4 can also be a complete stand-alone data processing system. It will fit the architecture and the specific application.

Up to 4,096 16-bit words ROM (35-nanosecond access) • up to 31 16-bit directly addressable registers • up to 256 16-bit words of scratch-pad • up to 65,536 16-bit words of 900-nanosecond core memory per memory I/O register • up to 8 8,192-word banks per memory I/O register with 4 ports per bank • real-time clock • storage protect • stall alarm • firmware floating-point with a 14-microsecond multiply of 32-bit numbers.

Offices Coast to Coast
DIGITAL SCIENTIFIC CORPORATION
11455 Sorrento Valley Road
San Diego, Calif. 92121, Phone (714) 453-6050

Datatype Has Reader

MIAMI, Fla. — Datatype Corp. plans to show the 3800 system featuring the Dataflow optical page reader operating under control of a 4K central processor.

The Dataflow can optically read input data typed on an IBM Selectric equipped with the Dataflow coded typing element, the company said.

The system consists of the DFR-100 optical page reader, the 16 bit 4K central processor, a nine-track, 360-compatible magnetic tape recorder and an ASR-33 Teletype.

Input data scanned by the



Datatype 3800 System

reader may be routed directly to magnetic tape or punched paper tape, or it may be edited, formatted and put on magnetic tape in master file format.

The magnetic tape unit provides bi-directional communication such that tapes can be read

back for processing or listing.

The general purpose nature of the central processor allows the system to be used as a data processing facility for small and medium-scale companies.

The company will be at booth 1634.

Periphonics Voicepac Allows for 2,000 Words

ROCKY POINT, N.Y.—Peri-phonics Corp. will show for the first time its Voicepac 2000, said to be the only voice response system to use words stored in analog form on a high-speed random access disk.

It allows the user to program up to 2,000 words into the system and change the vocabulary at any time.

The system is designed for either local or remote CPU-interfaced configurations, as well as a stand-alone system.

It is compatible with IBM 360 and other computer systems.

through a minicomputer interface which acts as the front end processor for the system.

When interfaced to a 360, Voicepac uses a mini programmed to make the main processor think it is looking at a tape control unit instead of a voice response system.

One of the features is that it operates in either the time-shared mode or as a stand-alone unit.

The company can also provide even greater vocabulary sizes, up to 10,000 words, depending on individual customer requirements.

The Periphonics exhibit will be at FJCC booths 3310-12.

**A dirty tape
can put a computer down.**

Depressing. Dirty tape causes data dropouts. And dropouts cost you money. That's a bad scene.

RCA Computer Tape helps keep computers up.

It's a special formulation that

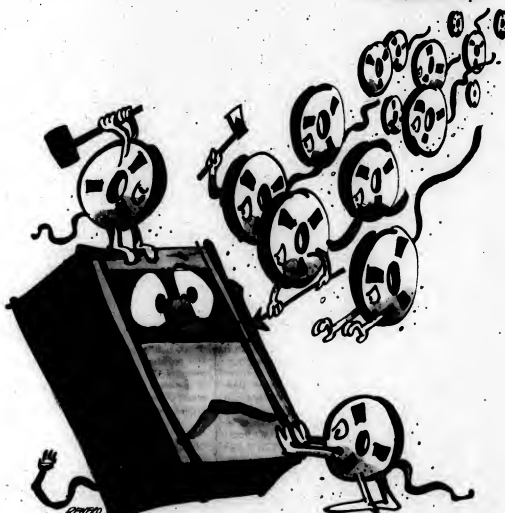
starts cleaner. Every inch of every reel is tested and certified in the cleanest of white-room conditions. (No statistical testing for us.)

Result? Fewer dropouts, more

· efficient computing.

Show your computer what
a good scene really is. Write
RCA Magnetic Products,
201 E. 50th St., New York 10022.
Our tape makes it.

RCA Computer
Tape



Beehive Terminals Have Unitized Construction

SALT LAKE CITY - Beehive will show a line of CRT alphanumeric display terminals featuring unitized construction.

The logic cards, functionally packaged, can be added on-site to expand the capabilities of the terminals as performance demands change, the company said.

This "add to" feature of Models I, II, and III, enables the 800-character display to change to a 1,600-character display; and the basic serial I/O capability to be changed to parallel.

Printer adapters, cassette adapter, and stand-alone cassette units are also options that can be added to Beehive Models II and III.

An RS 232B type interface is available to make the terminals plug-to-plug compatible with Teletype Models 33 and 35. In addition, Model III has features enabling it to be used in a time-sharing environment.

A standard Model I is priced at \$2,547, with all options extra. Beehive is scheduled for booths 2208, 2210.

Odec Will Show Models 801, 1321 Desktop Printers

E. PROVIDENCE, R.I. - Odec Computer Systems intends to display operating versions of its models 801 and 1321 desk top printers.

The Model 801 impact line printer is an 80-column, 150 line/min unit designed for use with minicomputers and time-sharing systems. The Model 801 costs \$6,500.

The Model 1321 is a 132-column, 110 line/min printer which offers 96 characters including upper and lower case. Single-unit price is \$7,900. Deliveries begin in December.

The printers use belt mechanisms and individual characters which snap on and off the belt.

Odec Computer Systems will be at booth 2711.

**A little
dropout...
is like being
a little
pregnant.**



There's no such thing.

On a read pass, a "little" dropout can cause ten retries. Or abort the job. And on write passes, it may waste up to nine inches of tape.

What's your million-dollar memory doing in the meantime? Waiting... expectantly.

In this business, one missing bit can ruin a reputation. That's why there's no such thing as a "little" dropout.

Handling damage causes most dropouts. But now Graham Magnetix has a tape



EPOCH 4
permanent magnetic tape

tough enough to resist this kind of damage. *A tape 80 times tougher than anything the competition has to offer.*

We named our new baby Epoch 4. And started it out in life with a 20-year warranty. Because it's really that good.

Look around. Is one of your transports in a retry cycle right now? Or erasing when it could be writing?

You could be a "little" bit pregnant, and not even know it. Maybe you'd better make an appointment with the man from Graham Magnetix.

GRAHAM MAGNETICS INCORPORATED

Graham, Texas 75046

WATS Phone 800-433-2701

Texas Phone 817-549-3211





What others claim, we do.

Ampex Extended Core Memory is busy at more than a dozen operating sites, doubling or tripling IBM 360 throughput. We're the only ones actually doing it on-line.

Our ECM has proved itself at such installations as universities, computer time-share services, a medical service center, governmental agencies and a number of major corporate EDP centers.

Ampex ECM at one university, using 360/65 Computer, has increased its computing speed 3.5 times over operation with the IBM 2361 LCS. Another user confirms that with the 360/50, Ampex ECM runs at 1.8 times the main core, far outstripping the LCS unit.

Our ECM has a cycle time of 4 or 2.8 microseconds, depending on the computer, expandable from 1 to 8 million bytes. It's a direct plug-in system to replace the IBM LCS with no software changes.

You can lease or buy, get direct Ampex installation and service from a worldwide organization of factory-trained personnel.

Call your Ampex representative for a list of operating sites. One call will be the ultimate guide to increasing your computer time efficiency. And you can ask about IBM plug interchangeable tape drives and other computer products from Ampex, the leader in computer peripherals—available individually or on an OEM basis. Call Ampex, (213) 836-5000, or write Computer Products Division, 9937 West Jefferson Boulevard, Culver City, California 90230.

Your computer counts on us.

AMPEX

Visit Ampex at FJCC Booth 3013

CTM Unveils UT-1000

MINNEAPOLIS, Minn. — Computer Terminals of Minnesota, Inc. will introduce the UT-1000 series of terminals.

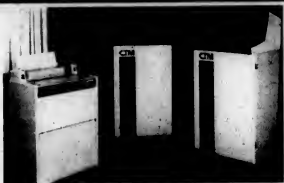
The UT-1000 system hardware consists of a communication processor, card reader, printer, disk, magnetic tape, CRT display, and character printer and can be interfaced with nearly every large computer, according to the firm.

The basic Remote Batch Communications Terminal is capable of providing tabulations and special printouts, along with data communications to and from a large computer.

The Data Entry and Remote Reporting Terminal offers the standard data communications capabilities of the Remote Batch Terminal, plus data capture by means of CRTs and a disk.

CTM's Key-to-Tape Terminal performs batch data communications and provides a semi-permanent record of the message content for storage, the company said.

The fourth member of the UT-



CTM Data Communications Terminal

1000 family is a Message Switching and Concentration Terminal. A multiplexer for multiple low-speed lines and a separate high-speed line permits the system to

store and forward communications, and print incoming messages.

CTM will exhibit at booths 3215 and 3217.

Clare-Pendar Exhibits Keyboard Using LSI/MOS Circuitry Scanning

POST FALLS, Idaho—Clare-Pendar Co. plans to exhibit a keyboard, for the OEM market, that utilizes LSI/MOS technolo-

All encoding, up to nine bits and four levels, is accomplished on one LSI/MOS chip. The company said this provides two advantages — single component reliability and plug-in code change capability.

The Clare-Pendar LSI/MOS keyboard uses a scanning technique, searching for a switch closure. Upon detecting a closure, valid encoded data appears at the bit outputs and a strobe appears to signal valid data.

Other features include: up to 88 encoded keys plus any number of direct functions; three modes at no extra cost; 200 mW



LSI/MOS Keyboard

power drain; and two key roll-over.

The keyboards also have TTL/DTL/MOS compatibility and either positive or negative logic, the company said.

Clare-Pendar will be at booth 3712.

Readout Tubes Light Display

LOUISVILLE, Ky. — A family of low-voltage indicator tubes will highlight General Electric's product display.

The three 7-bar segment, vacuum fluorescent tubes are designed to provide alphanumeric read-out for commercial and industrial digital display applications.

The alphanumeric tube family consists of the Y-4075 (a 10-pin subminiature base tube in a T-3 envelope), and the Y-1938 and Y-1939 (9-pin miniature base tubes in T-6 1/2 envelopes).

All three tubes can readout 14 different alphabet letters and numbers 0 through 9; in addition, the Y-4075 and the Y-1939 offer decimal points.

GE also will display five special monochrome CRTs; high resolution 4 in. by 5 in.; 7 in., 12 in., high-resolution 15 in. and 17 in. units. High resolution multicolor CRTs operated in monitors using 4 in. by 5 in. and 14 in. tubes will also be displayed.

The company will be at booth 2808-2810.

**NEED EXTRA
STORAGE
CAPACITY?**

(Especially Buntough
5500 Users)

EMR Computer has the following units for sale: Surrouchs (B-475) 60 megabit disk file - \$42,000. Requires Surrouchs (B-471) electronics unit - \$31,000. Electronics unit can handle up to five storage units providing 300 megabits of storage. Average access time: 20 milliseconds. For further information call or write:

EMR COMPUTER

DATA COMPUTER
8001 Bloomington Freeway
Minneapolis, Minn. 55420
Phone: (612) 892-9081 Ext. 435

The Datapoint 3360 and other outstanding Datapoint terminals will be on exhibit at the EICC, Astrodome Booth 1001.

Home Office: 8725 Datapoint Drive/San Antonio, Texas 78229/(512) 696-4630

Field Offices: Atlanta, Ga. 30328/1584 Twelfth Street N.E./ (404) 831-2828

Arlington, Va. 22209/1515 Wilson Blvd./ (703) 524-6455

Buffalo, N.Y. 14202/220 Delaware/(716) 852-5266

Dallas, Texas 75240/4300 Sigma/(214) 233-1056

The new Datapoint 3360 terminal for IR&D use and its companion 3364 Controller unit represents Freedom Now for companies which utilize 16 or more standard terminals in their IR&D networks —

- ★ Freedom from excessive costs associated with system operation.
- ★ Freedom from inadequate engineering design and low information throughput.
- ★ Freedom from your Central Computer System(s) from the privacy of IRAD terminal control and surveillance.

The Datapoint 3360-3364 combination, developed by Computer Terminal Corporation, provides striking operating and economic advantages for the user. Consider:

1. The 3364 Controller can direct up to 64 3360 terminals simultaneously, located either in close physical proximity to the controller or over a communications link. By contrast, the comparable IBM Controller can handle only eight display units, and they must be situated near the control unit.
2. The Datapoint 3360 has a standard CRT screen which displays 80 lines of characters-a line—1600 characters in length. The optional 3360-100 model has a 100-line display, almost double the capacity of the full screen IBM 2260. This translates directly into speedier data transmission, swifter recall and query resolution. The

Houston, Texas 77027/2400 W. Loop Building/(713) 626-0010
King of Prussia, Pa. 19406/200 Goddard Blvd./(215) 337-2646
Los Angeles, Calif. 90005/3807 Wilshire Blvd./(213) 260-2467
Minneapolis, Minn. 55420/7561 Metcalf Parkway/(612) 727-1344
New York, N.Y. 10019/1345 Avenue of the Americas/(212) 541-6

Here are the reasons why over 130 companies have already selected Novar

On every count—human engineering, electro-mechanical engineering, system flexibility, expandability, reliability, styling, field service coverage, and price—Novar stands head and shoulders above all others. And we're sure you'll find an A-B comparison will bear this out.

Here then are summary descriptions, and facts, about Novar's terminals and auxiliary devices you may wish to consider when planning or expanding your telecommunication system.



The **NOVAR 5-50 Business Data Communication Terminal** prepares hard copies of business papers and tape cartridges for computer processing. Data can go on-line, or can be batch antared from tape directly into the computer via telephone lines. Variable transmission rates available up to 2400 bits per second. \$6,715 when purchased, \$195 per month rented, including service.



The **NOVAR 5-41 Conversational Terminal** is portable, weighing less than 50 pounds. Operates on-line with all third generation computers that are compatible with 2741 type devices. Features a unique two-character buffer that prevents the printer from falling behind the computer when receiving data. \$4,500 when purchased, \$115 per month rented, including service. Portable carrying case also available.



The **NOVAR 5-51 System**, with multiple tape units, performs the functions of computer entry, error-free power typing, automatic typing, teleprocessing, and has the capability for high-speed interoffice terminal-to-terminal communications. When used with Administrative Terminal Systems, the 5-51 provides for adding, insertions, corrections, re-ordering of data and automatic justification. \$8,155 when purchased, \$235 per month rented, including service.



The **NOVAR Ten-Key Numeric Input** expands the capability of any Novar buffered terminal to include bookkeeping, accounting, engineering, scientific and other numeric functions. Terminals can be ordered equipped with the 5-02, or the unit can be added at any later time by attaching it to the built-in socket that is a standard feature on these terminals. \$490 when purchased, \$15 per month rented, including service.



NOVAR'S Expanding Product Line now includes auxiliary plug-in magnetic tape units, proprietary digital tape cartridge, various built-in modems, an acoustic coupler and terminal desks.

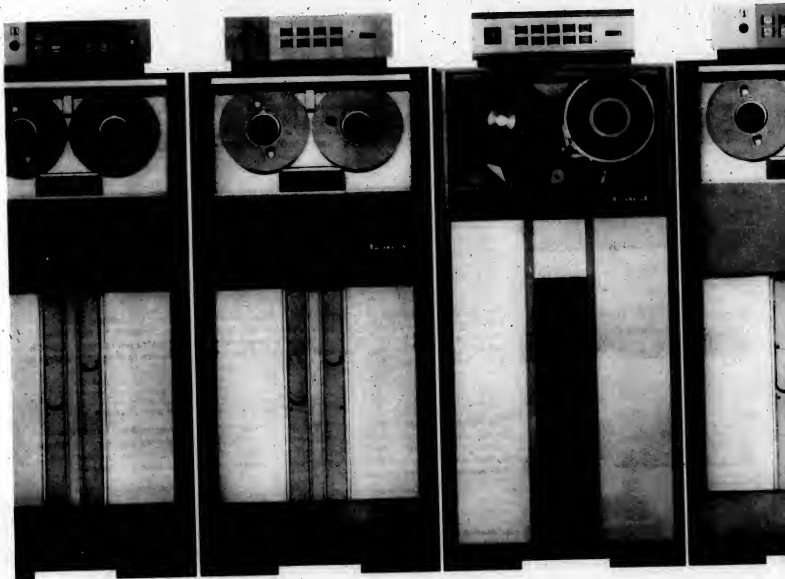
And Novar now has nationwide service in 56 cities.

Novar Corporation
2370 Charleston Road
Mountain View, California 94040
(415) 954-3900

NOVAR
A Part Of General Telephone And Electronics

See us at FJCC, Booths 1420 and 1422

LOW PRICE IS THE POTTER TAP THERE'S ALSO TR

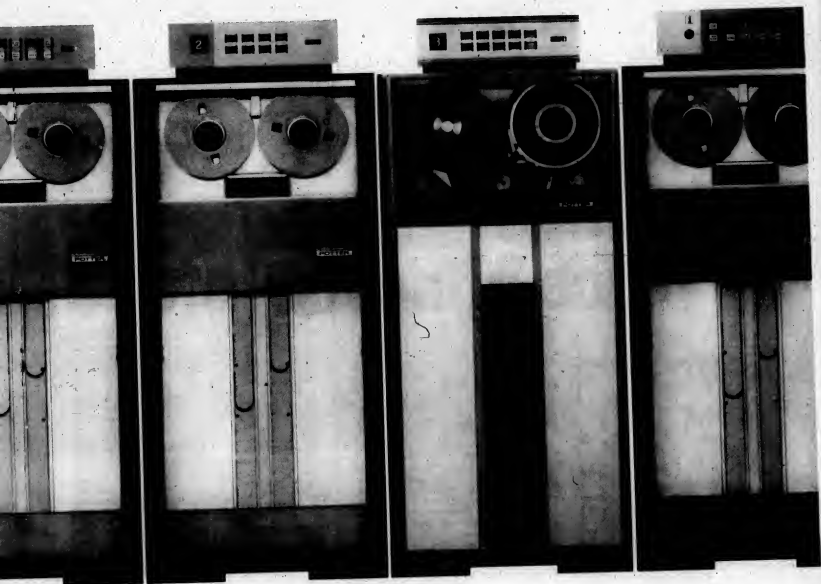


All 15 models of Potter's "plug-to-plug" Magnetic Tape Unit line are now supplied with our new Hard Coat recording head. The result is a series of tape units which can operate on IBM systems for over 2000 hours without adjustment for wear. This HARDWARE RELIABILITY insures you of better system reliability—

less down-time.

Then there's Potter's DATA RELIABILITY that assures you error-free output. Such things as single capstan drive, retractable read/write heads and automatic threading all work toward eliminating data drop-outs and errors.

ONLY PART OF THE DRIVE STORY... TRIPLE RELIABILITY.



Finally, there's SERVICE RELIABILITY. Potter maintains a nation-wide staff of trained field engineers to give you fast, dependable service... to keep your down-time to an absolute minimum... to keep your jobs on schedule.

There are more Potter manufactured tape drives in use on

IBM systems than any other independent make. For tape drives, disk drives or data terminals, call Potter first.

Potter Instrument Company, Inc.
532 Broad Hollow Rd., Melville, N. Y. 11746
Phone: (516) 694-9000



Potter. A lot more than less expensive.



STORAGE TECHNOLOGY CORPORATION

Control Unit, the ST3800 Tape Control Unit, is a plug-in device that controls the operation of the tape drive. It is a plug-in device that controls the operation of the tape drive. It is a plug-in device that controls the operation of the tape drive.

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benchmark +

The ST3800 Tape Control Unit



Data Modem, Multiplexer Perform for Codex Corp.

WATERTOWN, Mass.—Codex Corp. will exhibit the Codex 4800 data modem and the Codex 800 time division multiplexer.

The Codex 4800 data modem operates at 4,800 bit/sec.

The performance of the Codex 4800 is attributed to a unique modulation technique combined with a completely automatic and

adaptive digital equalizer.

Communication channel abnormalities are effectively neutralized to provide the widest range of immunity to unconditioned and substandard telephone channels, according to the company. The modem costs \$5,575.

The Codex 800 family of asynchronous time division multiplexers upgrade existing communications systems employing older frequency division multiplexers (FDM), TDM, and data concentrator techniques. The 800 allows the user to buy only the modules required for his

Codex Multiplexer

immediate 50 bit/sec to 1,800 bit/sec requirements. Expanded requirements involve plugging in additional channel modules or eight channel expansion groups. Prices start at \$2,000.

Both the Codex 800 and the Codex 4800 are said to have complete network fault isolation capability.

Codex will exhibit at booth 3630.

Hi-Tek's A/D Converter Has Self-Test Feature

SANTA ANA, Calif. — Hi-Tek Corp. expects to show its Model 737 analog to digital converter with 16-bit resolution at 150K word/sec. The unit has a self-test feature and incandescent display.

Other versions are available with 12-15 bits and reduced speed (50 khz).

Prices range from \$3,950 to \$5,900 for high-speed units and \$2,950 to \$4,450 for reduced speed units, and delivery time is four to five weeks.

• Hi-Tek will be at booth 2335.



Hi-Tek A/D Converter

SAC Will Show Graf-Pen Unit

SOUTHPORT, Conn. — Science Accessories Corp. (SAC) said it will be showing the Graf/Pen digitizing data gathering device, consisting of tablet, stylus and control unit.

The tablet has an active area 14 in. square and is supplied with interchangeable frosted and clear plates.

The stylus combines a ball-point pen with a tiny spark gap to generate a sound pulse which is picked up by strip sensors or microphones, along two sides of the tablet.

SAC noted that the basic configuration can be expanded to include a storage CRT or X-Y recorder for local display of the images being developed.

The control unit interprets information from the sensors indicating the position of the stylus on the X and Y axis of the tablet. SAC said that the unit is able to disregard all irrelevant noises picked up by the sensors.

The data bus from control unit into the CPU uses standard TTL levels, a company spokesman added.

Scientific Accessories Corp.
will be in booth 2713.

A-M Plans Many Displays

CLEVELAND — The Addressograph Multigraph (A.M.)

entry system, an optical code and mark read scanner, a copy duplicator, and a continuous copy system.

The Series 600 Computer Entry System features an on-line computer entry capability that provides data transfer without tape reel handling. The system consists of an electronic memory and control unit which is time-

The Model 9639 scanner is an optical code and mark reader interfaced to an IBM 029 keypunch. It is designed for the

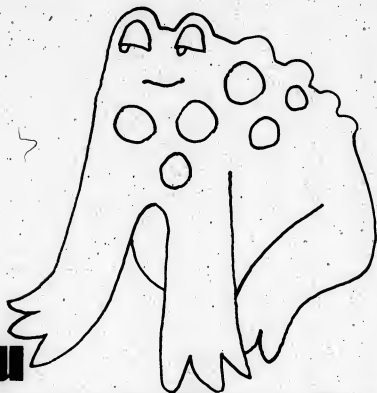
conversion of pencil mark and bar code data to punched cards.

The AMCO Copy-Duplicator can produce copies from a variety of originals at a rate of 90/min. Copies can be made on ordinary 16-lb to 20-lb paper, the firm said.

The A-M continuous Total Copy System combines the capabilities of an electrostatic printer and an automatic duplicator with speeds up to 150 copies per minute on ordinary paper. The machine copies nearly any type of original, the company said, including difficult colors, solids, pictures, or even worn drawings. Addressograph Multigraph will be at booth 1016.



You can get faster response time out of a 360 by adding more and more memory.



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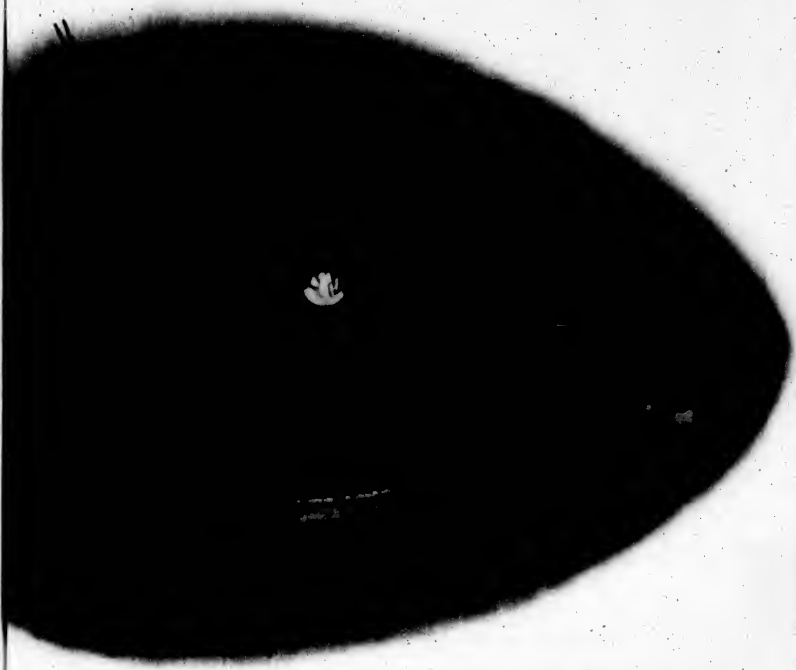
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train a girl to run it in a couple of hours. If she can type, she can enter data on the 480. Verifying on the DATA/SCOPE's 480 character display is about as difficult as watching T.V. And if she still manages to get into a jam, our exclusive "Help!" button gets her out. Now there's no reason anyone can't find happiness in data preparation. Especially you: your computer gets a magnetic tape containing 100% accurate data, fully

edited and formatted. No re-systematization is necessary. But you'll believe it when you see it, right? Then write: ENTREX, INC., 113 Hartwell Avenue, Lexington, Mass. 02173. Or phone (617) 862-7230.





An aquatic biologist takes a scientific sample for performing a water quality study.

Pollution Study Aided by River Recreation

APPLETON, Wis. — Scientists at The Institute of Paper Chemistry here are simulating environmental systems on a computer to better understand pollution problems.

Researchers can mathematically recreate their own river and its ecological loads on an IBM 360/44 to study the effects of pollution.

Dr. Robert Holm, director of the Institute's Division of Industrial and Environmental Systems, said: "The research is providing information and insight into pollution problems so paper manufacturers and others can make proper decisions regarding abatement. The computer simulation helps us separate individual or critical problems in more complicated systems."

The computer is used to simu-

late mathematically a river with varying characteristics of depth, width, currents and even rapids. The 360 can also represent the results of such natural processes as biological activity and re-aeration.

The model is based on a material balance formula that calculates the amount of oxygen in the river. In simplified terms, certain forms of pollution use up oxygen, which is needed to support plant and fish life. If oxygen is not replenished fast enough, the plant and fish life are affected.

"Without the computer, this type of research just wouldn't get done," Holm said. "The models are extremely complex because we are dealing with complex systems. Detailed calculations by any other method

are impractical.

"Simulation in effect allows us to extend instrumentation — to go into areas where it is not practical to measure things directly," Holm said. "The models are based on fundamental physical laws and describe the real physical system in some detail."

Two common types of water pollution study are biological oxygen demand and suspended solids. The first type of pollution can occur when organic materials (that can normally be assimilated) are added in quantities that overload the stream and use up available oxygen faster than it can be replenished.

Suspended solids can pollute the stream when they are sufficient to form a sludge on the bottom and interfere with plant

and fish life.

Since 1940, the Aquatic Biology Group has surveyed more than 10,000 miles of streams and estuaries used by the paper-making industry in the United States and Canada.

This group has developed a biological method of water quality evaluation that consists of sampling the aquatic population.

Tumor Treatment Kept Current With Computer

TORONTO — Doctors at the Ontario Cancer Institute are using a computer to help them determine more rapidly how to best treat different kinds of cancer tumors.

To assist the doctors in making their decisions the GE 425 computer is programmed with details of 45,000 cancer cases treated at the Princess Margaret Hospital in Toronto over the past 12 years.

The head of the division of physics at the Institute, Dr. Harold Johns, said that this is the first time that Canadian doctors have had access to such an up-to-date broad comparison method which covered all kinds of tumors.

The computer is used to reveal immediately what kinds of treatment kept alive the most number of patients with certain kinds of tumors, Johns said.

It can also be used to spot trends in cancer that can help identify causes of the disease.

For example, if the incidence of a cancer increases in a certain area of the province, doctors might be able to pick out an environmental factor as the cause.

Johns said that the data bank could be used by doctors at other cancer clinics throughout Ontario by hooking into the computer either through their own terminal, or by contacting the provincial department of health which could then get the answer from the computer.



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powerful Cobol and Fortran compilers; several systems for structuring and manipulating files and large data bases. Plus mathematical and simulation packages.

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Mini Proves Worth in Metal Fatigue Test of Planes

FT. WORTH, Texas — A minicomputer is used by the Ft. Worth division of General Dynamics (GD) to check out important structural components of F-111 supersonic aircraft.

The system, incorporating a Varian 620/i general-purpose digital minicomputer to analyze cyclic metal fatigue tests, has saved the firm more than \$100,000 in the first nine months of operation, according to Alan Arabian, General Dynamics test engineer. The savings is in terms of fewer man-hours required for the tests and less system downtime.

The purpose of the fatigue tests is to enable the builder to determine effects of various loads put upon key parts during actual flight.

GD can then ascertain the life-time expectancy of a part — and the plane.

The procedure for the fatigue test is a vital one in aircraft constructions and attendant safety considerations.

The part to be tested is placed in a test bed, where it is attached to a hydraulic ram.

The ram and the specimen are oriented so that the entire test simulates an actual air load, i.e., a flight condition which actually

would occur during some portion of an F-111 flight.

Cyclic Loading Test

The ram then subjects the specimen to a particular series of loads. The load testing is cyclic; it repeats itself over a given period of time until the total load upon the part is commensurate with a certain number of hours of flight, time of the aircraft.

According to the part and where it is situated on the F-111 aircraft, the test is repeated under a new set of flight conditions.

Cycles per condition vary, for most of the aircraft, from one to as many as 1,500.

The hydraulic ram, which is the testing "list" of the entire procedure, follows the in-

struction of the mini.

This minicomputer, with an 8K memory capacity of 16-bit, words generates a sinusoidal signal for the rams to follow, and at the same time counts the number of cycles each ram applies.

When the ram has applied as many cycles as it was supposed to for that condition, the mini computer automatically changes the condition and redirects the ram into a new series of fatigue tests.

While there is still someone in the test bed keeping his eye on everything, the mini is relieving an engineer from initiating and changing test cycles continuously.

Prior to using the minicomputer, testers at GD used a function generator which put out a sine wave, and a counter to

count the number of cycles, besides a manual potentiometer to vary the amplitudes of the tests.

Arabian estimates that the Varian 620/i cuts down man-

hour requirements by a factor of three.

Aside from the 620/i, a printer, paper tape punch and a teletype writer also are used to assist in data handling.



General Dynamics test engineer reads stress information from 17 columns of data on a high-speed printout tape during an F-111 metal fatigue test.

Manufacturer Fills Same-Day Parts Shipment

ST. LOUIS — With a constantly changing supply of approximately 4,000 kinds of parts, Carr Lane Manufacturing Co. in St. Louis still manages to fill better than nine out of 10 orders the same day they come in.

"We're using a computer now to process orders as soon as possible," said Earl Walker, company president. "The time we save handling orders means the shipping department has much more time to locate the needed parts, package them and send them on their way that day."

Carr Lane makes and markets through 150 distributors a complete line of components, quick release pins, chuck jaws, gages, bushings, stainless steel components and Carr Lane patented toggle clamps.

As soon as an order arrives, data processing personnel prepare punched "cards which are entered" into the firm's 360/210.

The cards trigger preparation of an order, packing list, gummed label for the shipment and the necessary records for invoicing which occurs the following day.

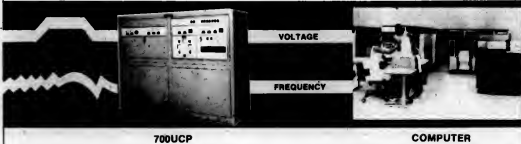
As orders are printed, the same data is used to update inventory lists. Analysis of these guides management in reordering stock and scheduling manufacturing operations to insure a better than 90% same-day order filling record.

Carr Lane plans to modify its card-oriented 360 to a disk-oriented one. "By storing order and inventory data on magnetic disks," said Dennis Burke, general manager, "we will be able to analyze inventory faster. We now compile inventory reports weekly. By using disk operations, we'll be able to compile exception reports daily."

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Computers to Monitor Prelaunch Trials of Jupiter Craft

REDONDO BEACH, Calif. — Two Pioneer spacecraft, scheduled for flights of 500 million miles to the planet Jupiter early in the 1970s, will be monitored during prelaunch rigors by computers.

TRW, Inc., prime contractor to the National Aeronautics and Space Administration for the Pioneer program, is presently installing two Xerox Data Systems Sigma 5 computers ordered for

checkout and qualifications testing of the spacecraft.

A Sigma 5, as part of a ground-based test station, will be assigned to each of the spacecraft, designated Pioneer F and Pioneer G. Pioneer F is scheduled for launch in February, 1972. Its sister ship is scheduled to follow approximately one year later. Flight time to Jupiter is approximately two years.

Each spacecraft will carry a number of scientific experiment packages, including instruments which will analyze the planet's atmosphere.

Enroute to Jupiter, the spacecraft's instruments also will measure magnetic fields, solar winds, cosmic radiation, and the nature and intensity of a meteor belt which separates earth from the outer planets.

As these experimental packages are integrated into the spacecraft, they will be thoroughly tested under laboratory-simulated in-flight conditions.

Data from all the instruments will be collected and encoded into a single telemetry signal by on-board communications equipment and then transmitted to a test station in the spacecraft assembly area.

At the test station, the Sigma 5s will process the data and report on the instrument's operations continuously. If a malfunction occurs, the computers will

print a description of the problem for TRW's engineers.

The Sigma 5s also will process data telemetered from such spacecraft operating systems as attitude control devices, power systems and communications systems, as these devices are integrated into the spacecraft.

Shipped With Craft

When the Pioneers are shipped to Cape Kennedy for launch, the computer stations will be shipped with the spacecraft to support all prelaunch test operations, both on the ground and after installation aboard Atlas/Centaur launch vehicles.

At launch, data collection responsibility will be switched to the Deep Space Network, a group of telemetry-receiving stations spaced around the world.

The computers will assist in the analysis of data collected by the spacecraft during their respective two to three year missions.

Difficulties in Synchronization, Timing Resolved for Astronomers

CHARLOTTEVILLE, Va. — Scientists here are resolving compact interstellar radio sources to less than a thousandth of a second of arc with the help of a minicomputer to solve critical timing and signal synchronization problems.

At the National Radio Astronomy Observatory (NRAO) near here, scientists are incorporating extremely long — even international — interferometer base lines to achieve resolution as high as one-thousandth of a second of arc in refining man's knowledge of extragalactic radio sources.

The Varian 620/i general-purpose mini-computer being used is adding new mathematical dimension to these astronomical experiments.

Called a "VLBI" — for Very Long Baseline — interferometer, the device is achieving at radio wavelengths the same order of magnitude resolution as the highest ever attained with optical instruments, even though wavelengths in the two regions differ by a factor of 10^5 .

The minicomputer is an easily programmable, 4K core memory machine using 16-bit words. The 620/i, performing an enormous amount of calculations and computations, predicts the time delays and phases that should be assigned to the two signals, given the position of the particular radio source being measured.

This forms part of the data processing capabilities of a special-purpose digital device handling the reproduced signals.

This device, specially designed by NRAO scientists, will correlate bit-streams of information coming from two tape recorders. What are known as "fringe frequencies" must be set into this device, and it requires highly accurate information.

Control signals going to the device must be updated at tenth-second intervals to maintain accuracy, a chore which is attended to easily by the mini, which calculates the required information in advance to an accuracy of a part in 10 billion and then gives the device 35 bits of information at the beginning of each tenth-second cycle.

Modern Feed Blending Gets Right Mixture

LINCOLN, Neb. — A Midwestern feed mill uses a small computer to help blend more than 100 different feeds at the lowest cost, and still maintain complete nutritional value.

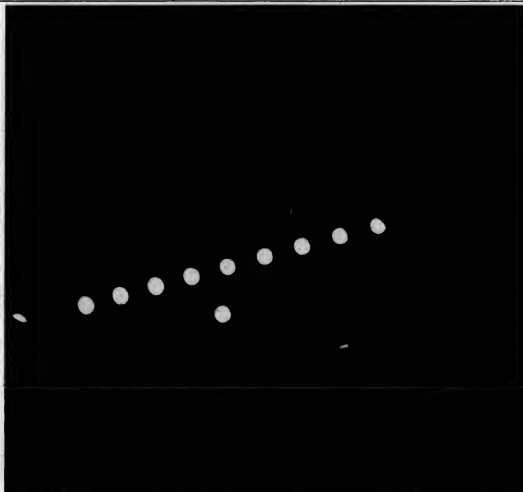
Goch Milling & Elevator Co. has 800 dealers in 11 states, and is one of the largest regional producers of animal feeds.

A typical animal feed can contain between 15 and 20 ingredients. Depending on the purpose of the feed, it must meet up to 30 nutrient specifications. The computer compares these requirements to ingredients available in Goch's Mills, and determines the best blend, based on nutritional content and cost.

Goch uses Linear Programming System, an IBM program product, in figuring its feed blends.

The computer makes a nutrient analysis of each feed, making certain it has the precise amount of such elements as phosphorous or Vitamin A.

In turn, the mini then acts as a middle processor at the other ends of the experimental calculation by accepting data from the receiver device and formatting it onto magnetic tape for a larger central machine which further analyzes and reduces data for the scientists to examine.



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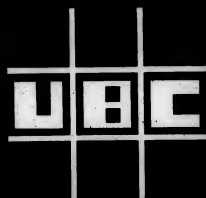
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Adapso Names Goldstein President for 1970-71

NEW YORK—The Association of Data Processing Service Organizations (Adapso) has named Bernard Goldstein president of the 260-member company trade association for 1970-71 at its ninth annual meeting in the Bahamas.

Societies

Goldstein, president of the United Data Centers Inc. in Greenwich, Conn., said in his acceptance speech:

"The important thing is that we must, of necessity, operate our businesses as a business, so that we will be able, in the near future, to obtain new capital and stimulate investor confidence."

"A growing industry, such as ours, must have these two things in order to fulfill its manifest destiny. We must recognize that

we must grow, that we must evolve, in order to serve a truly useful purpose in the economy of tomorrow."

T.J. O'Rourke, president of Tymshare, Inc., Palo Alto, Calif., was elected vice-president and Eugene Ustin, manager, Southwestern Computing Service, Inc., Tulsa, Okla., was elected treasurer.

The makeup of the new board of directors is:

J.G. Bartlett, executive vice-president, National Data Centre Corp., Ltd., Vancouver, B.C., Canada; R.D. Aldwell, president, Data Systems, Inc., Minneapolis, Minn.; and F.R. Luten, president, Automatic Data Processing, Inc., Clifton, N.J. Also, R.W. Olsen, president, Computer Services Corp., Southfield, Mich.; J.J. Palmer, president, CompuTerminal Corp., San Francisco, Calif.; and K.



Bernard Goldstein

Robinson II, president, Computer Servicenters, Inc., Birmingham, Ala.

Also, R. Guise, chairman of the board, Com-Share, Inc., Ann Arbor, Mich.; J.L. Roy, president, Tracom, Inc., Cincinnati, Ohio; A. Steinhart, president, Databab, Inc., New York, N.Y.; and E.T. Suters, president, Management Services, Inc., Atlanta, Ga.

Bema Appoints Herzog, Gabetti to Board

WASHINGTON, D.C.—The Business Equipment Manufacturers Association (Bema) has named R.H. Herzog of 3M Co. chairman of the board and G.L. Gabetti of Olivetti Corp. of America will serve as vice-chairman of the board.

Herzog and Gabetti will also be chairmen of the planning committee and finance committee, respectively. D.W. Barr, of Honeywell, Inc., will be chairman of the membership committee, and C.W. Spangle, of Honeywell, Inc., chairman of the nominating committee.

Serving on the executive committee for the year ending October 1971 are Herzog, chairman;

Barr, J.W. Birkenstock, IBM; Gabetti; C.S. Margach of Addressograph-Multigraph Corp.; R.E. McDonald, Univac Division; J.A. Saunders, The General Fire-

proofing Co.; and C.W. Spangle. The Bema Board of Directors for the 1970-71 year will be led by Herzog, chairman, and Gabetti, vice-chairman.

Calendar

Nov. 19-20, New York—Conference 70: 1970 Data Processing Conference sponsored by the DPMA. Contact: Conference Registrar, Conference 70, P.O. Box 1926, Grand Central Station, New York, N.Y. 10017.

Nov. 19-21, Houston—Fall meeting of the Digital Equipment Users Society (Decus). Contact: Angela Cosette, Digital Equipment Corp., Maynard, Mass. 01754.

Nov. 30-Dec. 2, Hollywood Beach, Fla.—3d International Forum of the International Business Forms Industries. Contact:

IBFI/PA, Graphic Communications Center, 1730 North Lynn St., Arlington, Va. 22209.

Dec. 3-4, Oakland, Calif.—10th Annual Conference of the California Educational Data Processing Assoc. (Cedpe). Contact: Bradford Burrin, Computer Systems, 991 Commercial St., Palo Alto, Calif. 94303.

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Call for Papers

1971 IFIP CONGRESS, August 23-28, Ljubljana, Yugoslavia. These triennial congresses and exhibitions are sponsored by the International Federation for Information Processing (IFIP), which represents the international science interests of its 29 member countries around the world.

Numerical mathematics, mathematical foundations of information processing, computer hardware, computer hardware and systems, systems management and administration, technological applications, and sciences and humanities are the list of categories for classification of papers. Authors should forward seven copies of a 100-word abstract in English, along with five draft copies of the full text of the paper in English. The text should not exceed 2000 words, and should be typewritten, double-spaced, on one side of the sheet.

The first page must carry the following information: title of the paper, name, country, affiliation and mailing address of the author, area of the paper according to the above classification of the IFIP Congress topics, large or oral presentation and a statement of originality.

A full set of illustrations, properly labeled to the text, must be included with every copy, but the figures need not be finished form, suitable for reproduction.

Submitted papers should be directed to the text, must be included to Professor C.C. Gottlieb, Vice-Chairman, IFIP Congress 71 Program Committee, Institute of Computer Science, University of Toronto, Canada. Authors will be notified of acceptance or rejection, and recommended modifications, by mail (March 1971). The final copy of accepted papers, ready for publication, will be due by May 1, 1971.

Educational DP System Gives Hands-on Course to Liberal Arts, Science Students

PALO ALTO, Calif. — Learning how to use a computer is becoming as commonplace for today's young people as learning to drive a car.

At Gavilan College in Gilroy, Calif., nearly every student — whether his major is history, sociology or physics — prepares for a future in a unusual way. One hundred to 150 students a

two years ago with an antiquated vacuum-tube computer.

Herb Peckham, chairman of Gavilan's physical science department, used this computer as the "icebreaker" to prove that a computer could be used advantageously in the school's educational program.

In the fall of 1969, Peckham convinced local school board officials that what the school really needed was a new modern digital computer system that would be totally dedicated to classroom teaching.

That fall, Peckham took delivery of a Hewlett-Packard 2007A Education System.

day are regularly accommodated.

Almost all of Gavilan's students receive "hands-on" experience with a digital computer before they graduate. Gavilan also brings the students from a nearby junior high school who are proving to be enthusiastic learners.

Gavilan's first venture into computer-aided courses began

It was accompanied by several education-oriented peripherals — a device for reading cards marked with an official lead pencil, a teletypewriter for entering and receiving data, and a photoreader which rapidly reads punched paper tape containing computer instructions.

With its Basic Language, the system was valuable to a large number of students in both science and non-science areas.

A particularly important subject for the liberal arts students was statistics, since the subject is a prerequisite to entering many schools or to taking upper-level courses.

Peckham initiated computer-aided statistics at Gavilan to offer the liberal arts students an opportunity to use and understand the computer.

Unlike the science students, who quickly learn to solve complex problems by devising relatively sophisticated computer programs, the non-science students learn only enough programming to be able to solve their statistical problems.

For both the science and non-science students, programming is relatively easy to learn.

"By using a computer" for much of the calculating necessary to solve their statistics problems, the students are better able to enjoy the subject matter. They avoid the frustration associated with calculating errors," said Peckham.

For educators teaching with a computer, Peckham warned that some students become more proficient at programming than the teachers.

Seventh and eighth graders from Brownell School spend 2-1/2 hours per week at Gavilan running programs they have



Prof. Herbert Peckham explains operation of the Hewlett-Packard Educational Computer System to a student in his statistics class.

written.

"Our hopes are to have even greater involvement of the local high schools and junior high schools with the system. With students gaining greater proficiency, using the computer from secondary school through the junior college, we can turn

out very capable students," said Peckham.

"With increasing use of the system, we eventually hope to move up to a time-share system that will enable 16 local schools to use the computer at one time," Peckham said.

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State Gets Inventory Plan

KIRKSVILLE, Mo. — The Northeast Missouri State College data processing center has completed a computerized information system for the Commission on Higher Education of the State of Missouri, according to Dr. Robert Bradley, director of the DP center at the college.

The system is designed to provide an inventory of all facilities in institutions of higher education.

tion in the state as well as several reports on selected types of facilities. The Facilities Information System consists of a set of 29 programs which handle the input, processing and reporting of functions.

Data is collected from every college in the state on a yearly basis to update the inventory file in terms of additions, changes and deletions to existing facilities.

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CI Notes

Control Data Seen As Airline Pact Loser

MINNEAPOLIS—Control Data can now be considered among the ranks of "also rans" in the race for the huge computer-based airline ticketing market.

CDC had been a major subcontractor to Burroughs on the recently canceled TWA system [CW, Oct. 28] and had also been a subcontractor to Univac on the United Airlines system, which was canceled last February. CDC lost around \$10 million on the UAL deal and stands to come up \$8 million short on the TWA contract.

Since IBM has apparently grabbed both the UAL and TWA pacts, industry sources consider it unlikely that the CDC machines will be used to supplement the presently planned systems.

ICL-Plessey Sign Plated Wire Memory Agreement

LONDON—A \$2,160,000 order from International Computers Ltd. for plated wire computer memory systems has been announced by The Plessey Company Limited's Components Group. The systems to be supplied by Plessey are its 250 series, a 290 nsec cycle time, self-contained modular unit.

Data Action and Talcoit Sign Leasing Agreement

MINNEAPOLIS—Data Action Corp. has announced completion of a leasing agreement with Talcoit Computer Leasing, a division of James Talcoit, Inc. of New York.

Under terms of the agreement, Talcoit will purchase up to \$6 million of Data Action's equipment over a period extending from October 1970 to December 31, 1971.

Present products included in the agreement are the Data Action Magnetic Data Recorder, Tape Pooler and Data Editor.

Amplex Corp Memory Deliveries Hit 1,000

CULVER CITY, Calif.—Amplex Corp. has delivered its 1,000th 18-mil core memory stack. The delivery was made to Digital Equipment Corp., Maynard, Mass., as part of a recent contract. The 3-D, 3-wire Amplex stacks are used in mainframe memories of DEC computer products.

Amplex claims it has delivered more memory stacks using 18-mil cores than any other independent supplier. The Amplex stacks delivered to DEC accommodate cycle times of 800 nanoseconds.

CW and Computer Exposition Drop Acquisition Discussions

NEWTONVILLE, Mass.—Discussions between Computerworld, Inc. and Computer Exposition Inc. regarding the acquisition of Computer Exposition by CW have been discontinued, CW announced recently.

A CW spokesman said that the discussions were called off when it was clear that agreement on a basis for acquisition was not likely to be reached. Computer Exposition operates the regional Compso trade shows.

Adapso Speaker Sees High Growth in Services Sector in Next 5 Years in Spite of DP Shakeout

NASSAU, The Bahamas—Even though the services sector of the computer industry is apparently undergoing a shakeout, members of the Association of Data Processing Service Organizations (Adapso) were assured of a healthy future at their recent management meeting here.

On the plus side, the keynote speaker, Patrick J. McGovern, president of International Data Corp., while noting that a shakeout was underway, predicted that the services sector will experience the highest growth rate in the industry during the next five years.

On the minus side, Adapso Executive Director Jerry Dreyer noted that out of the 67 members joining the organization in the last year, 54 have had to drop out due to mergers, acquisitions, bankruptcies, etc.

Even with the dropouts, however, Adapso did gain 13 new members and now claims to represent 50% of the sales volume of the service bureau industry.

McGovern said the bulk of service bureau growth will come from the increase in remote access data processing services and from the sale of proprietary software packages.

He observed that while on-site batch service bureau business will grow by 10% during 1970 from \$750 million to \$825 million, remote batch will increase by 50% from \$60 million to \$90 million. By 1974, McGovern predicted, the on-site batch business will yield about \$1.2 billion in annual revenues, while remote batch will have more than tripled to \$300 million in the same time period.

In contrast, he said, remote access immediate response services (Rair) is enjoying a 40% growth this year, and expected to reach \$165 million by year's end. By 1974 McGovern predicted that annual Rair business will be close to \$600 million.

McGovern estimated the contract and packaged software market at \$560 mil-

lion in 1970, increasing to approximately \$2 billion by 1974.

He indicated that the current shakeout would affect primarily undercapitalized and undermanaged firms. He expected that the number of firms in the service bureau business would decrease by 20% during the 1970-71 period, but the end result would be a much healthier business condition for the surviving firms and for the customers of the industry.

Some concern was expressed at the meeting about competition from the new IBM Basic Systems Centers, which were established to support the application of System/3.

One member said that these centers were offering data processing services to and becoming a growing competitor in the business and he indicated that this might be a violation of IBM's 1956 consent decree.

In relation to time-sharing, the association's Computer Time-Sharing Section will devote most of its energies to fight interstate tariffs being proposed for lines connected to computers, according to Thomas O'Rourke, president of Tymshare of Palo Alto, Calif.

These so-called "0.001s" are typically three to five times higher than the regular tariffs, he said, and he noted that the CTSS had helped defeat one proposal in Ohio and was fighting another in Illinois.

Nanomemory 2500 Cycle Time Is 500 nsec, Access Time 300 nsec

HAWTHORNE, Calif.—A core memory system available to the OEM from Electronic Memories has a cycle time of 500 nsec and an access time of 300 nsec.

"The Nanomemory 2500 is a development of the company's Nanomemory 2600 that has a cycle time of 600 nsec. The main differences between the two are, the company said, are a change in core size from 22-mil to 18-mil, and timing changes.

The advantage to the customer of this evolutionary development, the company said, is that he is not gambling with a prototype design. He's receiving, the company continued, a standard system with proven performance and reliability.

The Nanomemory 2500, a medium capacity 2-1/2D core memory, is capable of storing up to 294,912 bits in a single standard 19-in. rack. Configurations with word lengths of 8, 12, 16, 18, 20, 24, 28, 32, and 36 bits are available. Parity checking by 8-bit byte or word is optional.

All systems electronics and stacks are mounted on plug-in printed circuit boards for easy replacement as well as field expandability.

The price per bit of the Nanomemory 2600 starts at 6 cents. The memories are

McDonnell Douglas Automation Company Names Orihwein Head

ST. LOUIS—James S. McDonnell, chairman of the board of McDonnell Douglas (M-D), announced the expansion of McDonnell Automation Co. to McDonnell Douglas Automation Co. as a computer service business actively pursuing commercial clients coast to coast.

The new company expects to exceed \$100 million in sales in its first full year of business, 1971.

William R. Orihwein was named president and chief executive officer of the new corporation, with A. Ineph Quackchush as executive vice-president, internal, and Robert L. Harmon as executive vice-president, commercial.

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American Airlines Is Still Looking For Better Automated Ticketing

By Michael Merritt
cws staff writer

NEWTONVILLE, Mass.—American Airlines has a market and is looking for suppliers.

American's assistant vice-president for ground passenger services, Rodney W. King, said in a recent interview with CW that 35% of the tickets written by his company are amenable to computerization. And while American has been conducting several experiments, it is still looking for the best way to automate.

King estimated that American could use automated ticketing for about 70,000 tickets a day right now, with that figure growing fourfold in the next 10 years. "And American is only one airline," he added.

Describing his firm's efforts to automate ticket printing and vending, King said that American had good results from an experiment conducted at O'Hare Airport in conjunction with IBM and American Express.

At the O'Hare installation standard IATA tickets were printed and magnetically encoded following the passengers' instructions via pushbuttons. The passengers' credit cards, also coded with a mag stripe, were also read automatically.

"Our surveys showed that automatic ticket vending (ATV) had 99% acceptance, it was much quicker than hand-prepared tickets," King said. He also noted that American can put the system into operation whenever it feels that the savings in clerk time will equal the cost of the installations.

Credit Card Encoding

But King's main request was for a way of encoding credit cards. For either the ATV system or American's other experi-

ment, the Jets (Jet Express Ticketing Service) system to work, they must be able to read credit cards that can't be easily counterfeited.

The Jets system is less complex than automatic ticket vending. It is designed to sell simple one-way or round-trip tickets by issuing a coupon rather than a standard plane ticket.

King said that 35% of the tickets American sells itself are of the simple A-to-B or A-to-B-to-A type, representing in the neighborhood of 20,000 tickets a day that are now prepared by hand.

"The idea of Jets is to solid, so correct that our desire is to get it progressed rapidly—next month if we could," he stated.

And though most elements of the Jets system are ready to go, American's subcontractor has stumbled on the problem of mass producing the magnetically encoded credit cards that feed the system.

American's reservations system, Sabre, dumps its information concerning a Jets flight into the Jets minicomputer. The mini in turn handles all ticketing from then on—even being able to satisfy seat preference, in an advanced design.

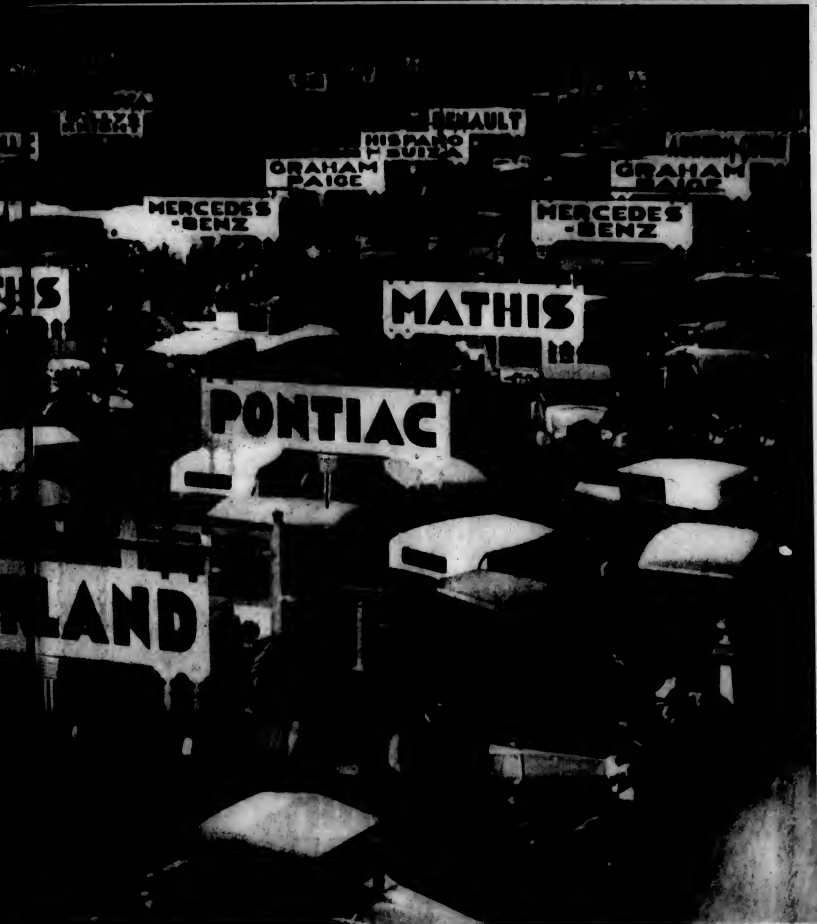
Simple terminals can thus handle the ticketing, rather than the more complex keypunches for the ATV system.

"We've received good support from the computer industry," King noted, "but we are still searching for somebody with an innovation." He added that "there is a large potential market for 'peripherals for ticketing'."

"We're looking at all the possibilities—mag cards, OCR devices, embossed cards, and we're willing to look at anything there's somebody out there with an entirely new concept."



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Contracts

Electronic Memories of Hawthorne, Calif., has received an order in excess of \$1,200,000 from the Department of Defense for delivery of large-scale core memory systems.

Univac has a contract, valued at more than \$11 million, from the Chicago Board of Education that calls for Univac to supply a 416-111 computer, 105 tape scope 100 graphic displays and supply operating programs or software, for the implementation of a computer-aided instruction project.

Burroughs Corp. has received a contract from the U.S. Air Force Logistics Command, valued at more than \$500,000, for the lease of six computer-output-microfilm units.

System Development Corp., Falls Church, Va., has received a \$717,000 labor-hour type contract from the U.S. Navy to develop new computer systems to help monitor submarine and surface ship movements.

Beloit Computer Center, Inc., Beloit, Wis., has announced that the city of Baton Rouge and parish of East Baton Rouge, La., has purchased the rights to use the center's municipal accounting and reporting system, Mars, in its data processing facility.

Computer Audit Corp. of Silver Spring, Md., has been awarded a contract from Dominick & Dominick, Inc., New York, for \$90,000 for development of a turn-key communications system to replace its present IBM CCAP message switching system.

The City of Spokane, Wash., will use census tract and block data gathered and processed by Boeing Computer Services in its urban planning, under a \$33,000, 14-week contract.

Public Safety Systems, Inc., a subsidiary of General Research Corp. of Santa Barbara, Calif., has been awarded a three-year contract by the City of Huntington Beach to develop an integrated command and control system for the city's emergency forces.

Informatics, Inc., Canoga Park, Calif., has been awarded the contract for development of a generalized computer data management system for the State of Hawaii.

Association Processing Corp., a subsidiary of Delta Data Systems of Kenilworth, Md., has a two-year data processing contract with the Albany Motor Club, Albany, N.Y.

Information and Communication Applications, Inc., Silver Spring, Md., has been awarded a contract by the Post Office Department to provide services in support of a computer-controlled system that uses airline schedules and Zip Codes to route mail pouches and generate airmail dispatch billing data.

Amperx Corp., Culver City, Calif., has received a contract exceeding \$600,000 to supply lithium cores to Plessey Electronics Corp., Hillside, N.J.

General Dynamics Electronics Division, San Diego, Calif., and Kaman Corp., Bloomfield, Conn., have each been awarded a \$300,000 contract by the Air Force Systems Command's Electronic Systems Division for definition studies on the Airborne Weather Reconnaissance System.

RCA has announced an Air Force contract for \$1.9 million to develop a computerized system that will do performance checks on jet engine fuel controls.

The Colorado School of Mines, Golden, Colo., has received a \$117,000 grant from the State Department of Natural Re-

sources to conduct a Colorado lands use and natural resource inventory.

Computer Sciences Corp. of Los Angeles will develop a comprehensive sales training course for the 12 operating companies of the Bell System under a \$155,000 contract from American Telephone & Telegraph Corp.

Cadcom, Inc., Annapolis, Md., has been awarded a contract by the Office of Naval Research to evaluate the applicability of computer-aided design concepts to design of externally mounted electronic systems on advanced submarines.

Management Research International, Inc. (MRI) Austin, Texas, has a joint licensing agreement with Control Data Corp. to provide MRI's Data Management System 2000 through CDC's Data Services Division in the U.S., Mexico, Europe, and Australia.

Edak Operations Analyzer May Eliminate Need for Job Tickets

SANTA MONICA, Calif. — A system for online collection and analysis of operating data on continuous process equipment and machinery has been developed by Bisset-Berman Corp., a subsidiary of Plessey Inc.

Known as the Edak Operations Analyzer, the system is designed to monitor as many as 36 (or more) causes of equipment down-time and up to four measurements of productivity.

It is said to eliminate the need for operator crew cards or job tickets, yet is compatible with the customer's computer operation.

The basic Edak system is made up of four units: a selector panel, power supply, data storage module and readout device. Operation is as follows:

The selector panel and power supply are wired into the main control panel and power source, respectively, of the equip-

ment to be monitored. At the beginning of each shift, the equipment operator plugs a data storage module into a receptacle on the selector panel.

When the equipment stops — for any reason — the data module automatically starts accumulating the elapsed time. Then before the equipment can be started up again, the operator must select the appropriate "reason" for the down-time on the selector panel.

This action causes the accumulated time to be assigned to its proper down-time data channel within the module. The equipment is then free to operate as usual.

Costs of the Edak system vary according to the number of functions to be monitored and the type of readout device required.

The Bisset-Berman Corp. is at 2941 Nebraska Ave.

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we are introducing this month. Our first is the fastest 1024 ROM on the market with the lowest power dissipation around. We can program it to your requirements with only a three week turn-around time.

Next is a 256-Bit Read/Write RAM with associated decoder driver. It is loaded with good features — fast cycle time, low

Mini Joint Makes a Splash

PALO ALTO, Calif.—The first and only mini joint computer conference was held here and appeared a smashing success.

Nick Horn of Century Data Corp. and Norm De Nardi of Singer/Librascope were co-chairman. This initial venture was modestly touted since the originators weren't sure how it would work out. Now there is enthusiastic talk about going on to bigger and better mini joints.

It was put together because of concern for all the people whose travel budgets were being cut and would be unable to be in Houston for the Fall Joint Computer Conference.

The exhibitors were very pleased with the cohesiveness and to make it a regional show on a quarterly basis. It is estimated it will cost each participant only \$100 for his participation.

One exhibitor said: "I think maybe we should pull out of the JCCs and spend money on more regional shows. There is real interest here, not just 'walk throughs' looking at exhibits for the fun of it."

There were 10 exhibitors including two manufacturers' representatives showing more than one product. It was estimated that there were 500 attendees.

Exchange Signals Changes in Real Estate

CW West Coast Bureau

SAN FRANCISCO—Creation of the Pacific Coast Real Estate Exchange portends a new development in the real estate business and another instance of computers improving the business community's practices.

The exchange opened in August and already has \$1.6 billion of properties committed to the file and 85% of the major brokers for the area covered have signed up for the service.

According to Gerald J. Jackson, president of the firm, it would have been impossible to provide his type of service without the speed and economies of super-scale computers.

The firm uses the Control Data Cybernet system, hooked up to the CDC 6600 in Palo Alto with backup at the Los Angeles facility. A Mark II printer is used as the I/O medium in the exchange's offices.

Purpose of the service is to match up buyer, broker and seller specifications with the best selection of properties available. Cost of use of the 6600 is minimal so that there is just a token fee for the computer service. "Our profit is made

when we find a property match," explained Jackson.

There are 10,000 listings now in the field and each property is described through 200 different items. By the end of 1970 they expect to have the service operating in Los Angeles to serve the southern part of the state, and 18 cities have been selected for the national expansion.

CII Comes up Winner With Loss

BROOMFIELD, Colo.—What happens when a company reports 1969 earnings of \$500,049 and in 1970 turns up a loss of \$305,545—and the stockholders love it?

Colorado Instruments Inc. (CII) gave this report at its annual meeting this month but stockholders loved the rest of the figures.

In June 1969, fiscal year, ending date, CII reported a drop in backlog of orders to \$248,662. This year the backlog is up to \$3,201,569.

The company hired John Zisch as vice-president of marketing and gave him the go-ahead to build up a marketing force which now includes eight major sales offices and five supporting service offices. Marketing cost was \$400,000 for the year, but it evidently paid off.

In 1969, OEM accounted for \$206,133 of the backlog. CII had signed an OEM agreement with Mohawk Data Sciences but found that it couldn't target the market. In 1970, OEM sales were down. Contract sales had been \$10,374 and this year they are \$31,694.

Direct sales by its own marketing force accounted for only \$32,155 of the earlier backlog and this year it accounts for \$3,169,066.

Of that \$3,169,066, the bulk is a \$2.4 million sales agreement with Ford Motor Co. for source data collection units to be used throughout its plants.

So far \$150,000 of equipment has been delivered and the order could go much higher than the original agreement if Ford expands use of CII units to all its plants.

Babcock Sees Trend Toward Hybrid Line

CENTURY CITY, Calif.—"Business is too tough to have IBM as the only supplier," said James Babcock, chairman of the board of Allen-Babcock Computing, Inc., as he announced to users of its time-share system recently that they now would be able to realize up to 50% in savings.

"We have returned to IBM about \$500,000 a year in bulk' cost and now have Ampex core. By this step alone we have been able to pass sizeable savings to our customers and increase our profits. This is just the beginning. Our next step is replacement of disks, tapes and communications," he said.

Babcock predicted that the trend in the 70s will be toward the hybrid line, and that the day may come when users buy only the CPU from mainframe manufacturers.

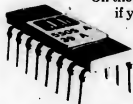
His advice to users considering other peripherals is to be sure that they are 100% compatible. He also recommended asking for the name of some customers

Industrial Sites Located

MONTEAGUE, Ala.—Development of a computerized system of locating industry in Alabama is scheduled as part of a \$250,000 federal grant.

Boeing Corp., Huntsville, will provide technological aid. Data teams will input information on an area's transportation facilities, labor pool, available utilities and industrial sites. Plant officials seeking new sites can match their needs with individual areas in the state.

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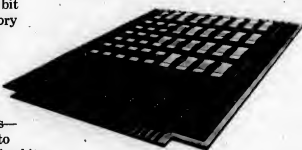


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DP Industry Can Learn From Comparison With Others

By Matthew E. Glifis
Special to Computerworld

The years 1963 and 1964 for the computer industry might be looked upon as the dawn of a new era. Starting then, the industry has introduced concepts and technologies that are accepted as buzzwords today: operating systems, data communications, time-sharing, whole businesses such as third-party leasing, software houses, facilities management, etc.

As long as this industry and its users customers were expanding at a rapid rate the excesses and problems building within the industry did not become apparent.

However, 1970 is rapidly becoming the year of atonement for the industry, in which many a management is finding that penitence, prayer and charity alone cannot avert the severe decree.

There seem to be no substitutes for management, marketing and capital.

The murky view is very much like

alphabet soup — ranging from Astrodata through CAI, Data Products and Telex to the fabled Viatron. Among these are some of the names that have appeared in financial trouble in recent days.

Allegory Remote?

Unfortunately, the biblical allegory seems too remote for many people. The computer industry might learn a lot, however, by recognizing that it may not be as unique as most thought during the past decade.

Through being more convenient with the history of other businesses, the EDP industry might better plan and recognize the phases of its own.

In particular, the EDP industry has often been related to the automotive industry, but usually only in the sense that by 1975 outside revenues of \$30 billion will be about the same.

In fact, the comparisons go a lot deeper. They have their Ralph Nader, they have

our Herb Gresh. They have products ranging from a Yamaha bike to a hand-

Viewpoint

tooled Maserati; we have equivalents ranging from Viatron to CDC.

We have five dwarfs now struggling to hold on; they still have American Motors. And in that alphabet soup I mentioned, you can pick any one of them and relate it to a name like Packard, Kaiser, Desoto, Hudson, Studebaker, Corvair, and, of course, Edsel.

Looking back, for their Charles Kettering, we certainly had von Neumann. And it is only fair that Tom Watson Sr. be credited with being our answer to Alfred Sloan.

What can we learn then, and perhaps point, from comparison of the two industries? Moving from machine level to assembly level coding was comparable to

the development of the synchrotransmission.

The coming of operating systems can be directly equated to the automatic transmission.

The concept of a computer utility, on the other hand, is comparable to the entire public transportation network in that no matter how efficient and cheap it can be shown to be, people would rather ride in their own cars, which creates, of course, machine overcapacity.

AT&T planning, or lack, for its communications network is not very much different from the highway planning of the 50s. Invariably, their capacity was inadequate by the time they were completed.

I would contend that the system 360s and series 200s of the 1960s were but the homeless carriages of our industry.

The hardware of the 70s which will be used as front-ends, terminals, concentrators, peripheral controllers, and uses yet unheard of, are the closest thing to the Model-T of our industry.

The financial turmoil in the industry now is comparable to an era which led to the founding of General Motors and Chrysler, and is bound to leave an indelible mark on the history of our business.

In the absence of expansion personal advancement becomes increasingly difficult. At the other extreme are those who have been or may yet be at least temporarily dislocated.

The smoke will soon clear, however, and the time for redirection is at hand. Companies and individuals in the DP industry must see to it that what evolves and what is supported is a healthier climate in which true and traditional competition prevails.

In the short run those less fortunate can be assisted in placement. In the long run both the investment decisions and the personal career planning can become strong influences for good on the future of dynamic and exciting industry.

Matthew E. Glifis is assistant to the vice president for planning at Honeywell Information Systems Inc.

Market for Low-Cost Bulk Storage Called Growing Opportunity

COMPTON, Calif. — According to Dr. Donald Gimpel, vice-president of Genesee Technology Corp. here, low-cost bulk storage for computers is a market that cries for the entry of medium to large manufacturers — and that is what his company is doing.

"At present," he noted, "a minicomputer user can pay more for the peripherals than for the computer. If he wants to save money he has to go outside the main manufacturer."

Peripheral manufacturers can produce units for a lower price for two reasons. First, they are strictly in the electro-mechanical field, which the computer company is not. As Gimpel puts it, "It's a different kind of fish."

Secondly, the computer company doubles price because of the problems of stocking parts, maintaining an inventory and providing service. While Genesee's product is much lower than that offered by the computer companies, "We are not going away the store," he said.

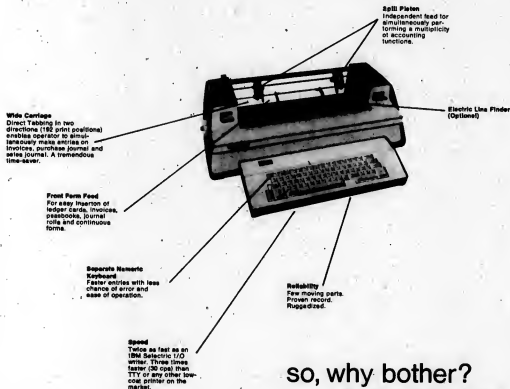
As far as the health of the industry goes, he said that potential customers now make unexpected plant inspection trips and ask for financial statements.

"This is a situation never before known in the computer industry."

The tape cassette field, he said, is lagging behind Europe, which is well along the way towards standardization.

In August 1970, the standards were drawn up and will be submitted for adoption this December.

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Nickels and Dimes

Bit by bit, Levin-Townsend Computer Corp. is extricating itself from Las Vegas. The troubled leasing company had made several real estate acquisitions here during its heyday, only to find that it knew the computer business better than it did real estate. Among the properties bought by its 82%-owned National Equities subsidiary was a country club. National Equities has finally gotten rid of it and several other properties for \$4.25 million and assumption of liabilities totaling about \$7.5 million. National Equities previously charged an extraordinary writedown of \$9.3 million against its Nevada properties in its fiscal year ended March 31. As a result, it said, it won't report any gain or loss on the sale in its current fiscal year. The purchasers were Realty Holdings, Inc., and Country Club of Las Vegas.

\$\$\$
California Computer Products, Inc., reported net income of \$419,288 on revenues of \$8.6 million for the first quarter of fiscal 1971, compared with earnings of \$29,780 on revenues of \$4.6 million for the same period last year. On a share basis, earnings amounted to 18 cents per share on 2,276,671 average shares outstanding, compared with four cents per share on 2,262,047 average shares outstanding a year ago. The 450% increase in per share earnings and nearly 100% increase in revenues for the period represents the largest first quarter in company history.

\$\$\$
Standard Register Co., a major manufacturer of business forms and equipment, has announced that for the third quarter of 1970 ending Oct. 4, net revenues rose to \$25 million, up from \$24.9 million in the same period last year. Nine-month revenue was \$77.3 million up from the same period last year when net revenue was \$75.8 million. Net after-tax income for the nine-month period decreased to \$2.8 million, or \$1.30 per share from \$2.9 million, or \$1.37 per share a year ago. For the quarter, net after-tax income was \$652,128, equal to 30 cents per share, in the same period of 1969, net after-tax income was \$854,773, or 40 cents a share.

\$\$\$
Beckman Instruments, Inc., of Fullerton, Calif., has reported a flat first-quarter. For the three months ending Sept. 30, Beckman earnings totaled \$562,213 on sales of \$31.1 million, compared with earnings and sales of \$875,411 and \$31.6 million in the previous year. Earnings were 25 cents a share for both periods. "Although the domestic economy is softer than a year ago," said Dr. William F. Bahhaus, president, "we have been able to hold sales and earnings at approximately last year's levels."

Unit Bright Spot

CDC's DP Still in Red

MINNEAPOLIS — The computer half of Control Data Corp. is still losing money.

Last of the dwarfs to report for the most recent quarter, CDC revealed that only the operations of its Commercial Credit subsidiary saved it from plunging into the red.

Loss before extraordinary items and Commercial Credit's earnings totalled \$4.4 million for the third quarter and \$16.6 million for the nine months, on total revenues of \$132.4 million and \$401.8 million respectively. Including Commercial Credit's and extraordinary items, net earnings were \$5.5 million and \$9.9 million or 36 cents and 61 cents a share.

For similar periods in 1969, the overall CDC picture showed net earnings of \$12.2 million and \$42.7 million, or 83 cents and \$2.90 per share. Total revenues in 1969 were \$137.1 million for the quarter and \$410.5 million for the nine months.

Commercial Credit supplied net earnings of \$9.5 million for the quarter and \$26.3 million for the nine months.

R&D Holds Up

Despite the losses, CDC's R&D budget has held up quite well. In the third quarter of 1970 R&D expenses came to \$7.4 million, while in 1969 they were only \$6.8 million. Over the nine months R&D expenses are substantially flat. Since CDC depends on innovation for its competitive edge, maintenance of a strong research program is a long-term bright spot in a gloomy short-term picture.

In the second quarter computer operations had experienced a loss of \$5.6 million.

Early in the fiscal year CDC President William C. Norris had predicted that the computer half of the company would be sad.

"Although we expect that the second half will show some improvement after the first," Norris said when announcing second quarter results, "the year as a whole in the computer portion

of our business won't be profitable."

At that time he went on to say that while CDC had seen some improvement in orders, shipments would not come until 1971.

CDC's situation was also improved by estimated income tax credits of \$2.4 million for the quarter and \$10.1 million for the nine months. Extraordinary items, primarily tax credits on the losses of foreign subsidiaries, were \$332,000 and \$253,000, respectively.

'Lack of Working Capital' Causes Layoffs at SCC

DALLAS — Scientific Control Corp. seems to be knocking at death's door once again.

The terminal maker has announced that it has substantially reduced its working force because of a "lack of working capital."

Earlier this year SCC was taken out of bankruptcy by Great Southwest Corp., part of the ailing Penn-Central group.

While SCC did not reveal the exact number of employees laid off, a company spokesman said that a skeleton crew of 10 to 20 in the engineering, manufacturing, and accounting departments was acting as a "holding force."

Since Great Southwest's purchase of a majority of SCC, an SCC spokesman said, SCC and GSC computer investments, Inc., a GSC subsidiary, have been "endeavoring to obtain the additional working capital," but that efforts have been "greatly hampered" by GSC's own liquidity problems.

SCC also revealed that GSC Computer Investments had pledged its shares in SCC to Harris Intertype Corp. to secure payment of a \$100,000 capital loan. The loan is now past due, but SCC is "currently negotiating to refinance" the loan.



"What Goes Up Must Come Down" ... You've Been Saying That for 5 Years Now.



COMPUTERWORLD

financial

\$4.6 Million Loss Expected By UCC in Third Quarter

DALLAS — University Computing Corp. is predicting a \$4.6 million loss for its third quarter.

According to its preliminary figures, establishment of general reserves of \$7 million, losses on

discontinued operations of just over \$1 million, and operating losses of nearly \$250,000 — a total of approximately \$4.6 million — are responsible for the net loss.

The drop was partially offset by about \$2.4 million in realized gains and investment income from unconsolidated insurance subsidiaries, along with about \$1.4 million of tax loss.

UCC reported a profit of \$3.2 million for the third quarter of 1969.

The company estimated its revenues at about \$29 million for the quarter, well down from \$32 million a year earlier. Nine-month revenue was about \$98 million, up from last year's \$74 million, however.

The \$7 million reserve was set up for contingencies relating to investments, other assets, and the company's divestiture program.

UCC President Charles L. Wylly, Jr. said the determination of the reserves reflects the judgment of the company's management as to possible future losses in those areas.

He emphasized that the reserves were for future contingencies.

Booth Computer Earnings Increase, Greyhound Computer Not Falls 28%

As for the leasing companies, it's up and down. In San Francisco, Booth Computer Corp. announced that its third quarter earnings were up 24%, while in Chicago, Greyhound Computer said that per share earnings for the third quarter were off 28%.

For the quarter, Booth earned \$785,000 on revenues of \$10.2 million, or 42 cents a share.

This compares with revenues of \$9.8 million for 1969, which brought earnings of \$654,000 or 33 cents a share.

For the nine months Booth revenues were a record high of \$30.7 million, with earnings of \$2.3 million or \$1.22 a share. This compares with revenues of \$28.4 million and earnings of \$2 million or \$1.10 a share for the nine months ended Sept. 30, 1969.

Fully diluted earnings for the quarter were 39 cents a share in 1970, and 32 cents in 1969. For the nine months ending Sept. 30, 1970, fully diluted earnings were \$1.12 a share compared to \$1 in 1969.

Greyhound Results

Greyhound Computer Corp. had consolidated net income of \$764,000, or 18 cents a share, for the third quarter of 1970, down from net income of \$1.1 million, or 25 cents a share, in 1969.

For the nine-month period ending Sept. 30, net income

totalled \$2.5 million or 58 cents a share, compared to \$3.7 million, or 85 cents a share, in 1970.

Revenues for the nine months rose slightly to \$37.2 million in 1970 from \$37.1 million in 1969, but third-quarter revenues declined to \$12.4 million from \$12.8 million in 1969.

W. Carroll Bumpers, GSC president and chief executive officer, attributed the decline in earnings primarily to the loss of revenue on U.S. computer rental equipment during the turnaround period between customers and cited a slowdown in the markets for data services as a contributing factor.

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GROUP COMPANY

Telex Earnings Rise

TULSA, Okla. — The Telex Corp. has reported that for the fiscal half-year ended Sept. 30, company net income was \$5.2 million compared with \$1.8 million for the corresponding period a year ago. Fully diluted earnings per share increased to 50 cents from the 18 cents per share earnings a year earlier.

Telex sales for the six-month period increased from \$22.6 million to \$40.4 million.

For the quarter sales increased from \$13.1 million to \$23.7 million. Fully diluted earnings per share for the second quarter were 27 cents compared with 10 cents a year earlier.

Telex President S.J. Jettre attributed improvement in company performance to the progress of the firm's Computer Products Group which sells and leases computer peripheral products.

Backlog improved from \$2.1 million last year to \$28.5 million.

Com-Share Losses, Sales Rise for Year

ANN ARBOR, Mich. — Com-Share, Inc. has reported a net loss of \$3.5 million or \$4.36 per share for the year ended June 30, 1970 compared with a loss of \$3.3 million or \$3.94 per share as restated for the previous year.

New sales were \$4.9 million up from \$3.9 million a year earlier as restated.

For the first quarter ended Sept. 30, 1970, the company reported a loss of \$365,000 or 47 cents per share (unaudited), down sharply from the loss of \$1.1 million or \$1.47 per share (unaudited) for the same period last year.

Quarterly sales increased to \$1.3 million from \$1.2 million. The company attributed the improved quarterly results to reductions in operating expenses as well as increased sales.

Accounting Changes

Com-Share noted its financial statements for 1969 have been restated from amounts previously reported to reflect

reclassifications and certain accounting changes.

The increase in accumulated deficit as a result of these changes was \$802,413 in June 30, 1969, of which \$736,760 is attributable to the year ended June 30, 1969, and the balance to prior years.

Com-Share now reports on a straight-

line basis over the lives of the agreements the revenue received in the form of common stock in other companies, in exchange for providing services.

This change in accounting method resulted in an increase in the loss for the years ended June 30, 1970 and 1969 of \$55,504 and \$723,818 respectively.

Printer Designed to Cut Delays

NEW YORK — A high speed printer, designed specifically to eliminate peak trading order backlogs within the financial community, is being manufactured and marketed by the Shepard Division of Vogue Instrument Corp.

Several Shepard printers are already operating on a test basis within the securities industry.

Capable of receiving and printing 60 trading orders a minute, the printer, Model 828, is said to be the only high-

speed terminal that produces an order ticket in the format accepted and approved by the Floor Committee of both the New York and American Stock Exchanges.

When operating remotely via telephone lines, it has a full-line buffer of 28 characters with an additional 50 character reserve to assure uninterrupted transmission, Shepard said.

The printer, when used on the trading floor of an exchange, can eliminate backlog that often exists during peak trading hours and handles the workload of several teletypewriters now located at each trading post and at many booths maintained by member exchange firms, according to the manufacturer.

The printer is said to furnish instant information capabilities, a safe guarantee in delivering opening price orders, and faster and quieter operations on the exchange floor.

Current communications transmission facilities within the major exchanges are now capable of transmitting 60 buy and sell orders a minute to each terminal, and the Shepard printer can match that capability.

At crucial times during the trading days, when the opening, the speed of the printers can guarantee the receipt of opening price orders for timely execution, Shepard said.

ADP Reports Record Earnings, Revenues

CLIFTON, N.J. — Automatic Data Processing, Inc. (ADP) has reported record revenues and earnings for the first quarter ended Sept. 30, 1970.

Net earnings rose 47% to \$878,929 or 16 cents per share from \$598,449 or 12 cents per share a year ago. Gross revenues increased 28% to \$10,312,568 from \$8,071,752.

The company also announced that its common stock, now traded on the Amex, is scheduled to be traded on the New York Stock Exchange effective Nov. 10, 1970.

ADP offers payroll processing and other commercial data processing services from its nationwide network of computer centers.

Optical Scanning Has Red Quarter

NEWTOWN, Pa. — Optical Scanning Corp. disclosed a consolidated loss for the quarter ended Sept. 30, 1970 of \$348,800 or 64 cents per share, compared with consolidated net income of \$146,900 or 27 cents per share (including tax benefits of one cent per share) for the same period a year earlier.

Gross revenues decreased to \$1.4 million from \$2.7 million, down 47% from the previous period.

The anticipated loss for the first quarter of the new fiscal year was due to an overall decline in the computer business that has resulted in order cancellations and stretch-out of existing orders. During this period, operating expenses were reduced, the company said.

Optical Scanning designs and manufactures electro-optical systems which "read" business forms to acquire data for input to computers.

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of card punch/readers

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Organization _____		
Address _____	Zip Code _____	

Lobbying Would Call Congress Attention to DP Plight

By Phyllis Huggins

CW West Coast Bureau

When the computers slow down, watch out!

And the computers are slowing down. This is an economic indicator of its own, not just for industry and business but for the state of economic health in this country.

Computer sales are off. Forecasts have hit the dust. Orders that were placed for new equipment are being stretched out.

Instead of a serious shortage of programmers, as expected, we have programmers unemployed for the first time.

Many organizations have cut down on the work hours for their installations and have excess machine time for sale.

Why is this a serious economic indicator of its own? Computers are at the pulse of what goes on in this country, in all aspects, and in particular for new activity.

This is one of the few growth

industries. Yet growth is being snuffed out. This affects all the peripheral companies, software firms, every segment of the computer industry. Instead of new improvements being put through the exciting phase of development.

Huggins' View

ment, we see developments being shelved for lack of capital and user unwillingness to risk new things in this economic climate.

The industry, which was in a marvelous flowering phase of new ideas, new companies and new products, is willing badly.

Potential customers make unexpected trips to small companies to inspect their factory

and their financial statement, something never before known in this industry.

Research teams are being broken up. Projects are not being renewed. New research money is impossible to find, not just because of aerospace and space cutbacks, but because of anti-intellectualism/anti-research attitudes by both major parties in Congress and lack of spending by Congress.

Robert Finch, in a recent press conference, said it might be two to six years before the country could once again absorb its technical talent. He also said that the Defense Department used to seek out industry, but that government is now a buyers market. In other words, companies have to seek out the government.

But with no guarantees of any

follow-up government spending to write off the research and development costs, return a necessary profit, and make the risk worth the gamble, companies are going to do very little "seeking out."

The American Federation of Information Processing Societies (Afps) represents not just the technical people in the computer community, but through its exhibits, which are the largest in the industry, it has a responsibility to the total industry.

Lobbying is a dirty word to technical people. However, lobbying is needed to call to the attention of Congress and government officials the plight of this critical industry. It is not just "another" industry. It is crucial to every aspect of our country.

System Development's Earnings Rise, Sales Drop in 1st Quarter

SANTA MONICA, Calif. — System Development Corp. (SDC) has reported earnings of \$428,000 and sales of \$11.6 million for the first quarter of fiscal 1971 which ended Sept. 27, 1970.

This compares to earnings of \$57,000 and sales of \$14 million for the same period last year. SDC President Wesley S. Melahn said the higher earnings were influenced materially by the tax loss carryforward. This carryforward, he noted, would be used up early in the second quarter. He said other factors which contributed to the first quarter's increased earnings involved reduced administrative, research and development costs.

Even though total sales declined approximately 17%, caused primarily by continued cutbacks in the military market, Melahn pointed out SDC's Public Systems Division followed its upward trend initiated last year.

The division reported first quarter income of \$1.8 million, a 20% increase over last year's record first quarter figure of \$1.5 million.

Major contracts in the Public Systems area which had an impact on increased revenues included the \$2 million award to develop an integrated municipal information system in Charlotte, N.C., and an \$852,000 contract to develop a system for improving freeway diamond interchanges for the U.S. Department of Transportation, Bureau of Public Roads.

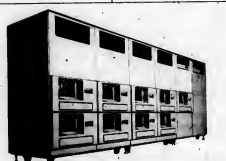
Other important efforts begun during the quarter included Space and Range Division's \$2 million "Pepe" (Parallel Element Processing Ensemble) contract with Bell Labs for the Advanced Ballistic Missile Defense Agency, and Commercial Systems Division's team effort for insurance company of North America (INA) in designing a comprehensive computer-assisted operations system.

SDC also has been selected as one of two primary implementation contractors to help develop a master plan for a broad-scale

computer-based information system to serve the U.S. House of Representatives.

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In booth number 3018.



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Tokyo 100, Japan. Tel. Tokyo (03) 270-2111

Earnings Reports

BRADFORD COMPUTER & SYS.
Three Months Ended Sept. 30

5th Earnings	\$ 11	\$5.05
Revenue	2,203,814	1,326,490
Earnings	318,925	155,405
ad Mo Shr	29	6.12
Revenue	6,261,982	2,947,900
Earnings	870,306	335,444

a Based on average number of shares outstanding before repurchase of warrant. b Adjusted to reflect a two-for-one stock split effected May 15, 1970.

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Company

Title

Address

City/State/Zip

Computerworld Stock Trading Summary

TRADE QUOTES

CLOSING PRICES THURSDAY, NOVEMBER 5, 1970

All statistics
compiled, computed
and formatted by
TRADE-QUOTES, INC.
Cambridge, Mass. 02139

		PRICE							PRICE				
T Y C H		1970 RANGE	CLOSE NOV 5 (13)	WEEK HIGH 1970	WEEK LOW 1970	WEEK PCT CHNGE	E X C H		1970 RANGE	CLOSE NOV 5 (13)	WEEK HIGH 1970	WEEK LOW 1970	WEEK PCT CHNGE
SOFTWARE & EDP SERVICES													
D	ADVANCED COMP TECH	1-8	1 7/8	1 7/8	1 1/4	-11.7	D	STANDARD REGISTER	17-30	17 1/4	1 1/2	+ 1/2	+2.9
A	APPLIED DATA RES.	4-24	6 1/4	6 1/4	5 1/2	-11.9	N	UNARCO	22-36	22 1/2	2 1/2	-2	-8.1
D	APPLIED LOGIC	1-19	1 1/4	1 1/4	1 1/4	-16.8	A	MAGNAN MAGNETICS	7-10	8 3/4	3/8	3/8	+0.0
D	ARIES	1-8	2 1/4	2 1/4	1 1/4	-10.0	D	MALLACE BUS FORMS	18-41	17 1/2	-18 1/4	-17 1/2	-51.0
A	AUTOMATIC DATA PROC.	25-47	12 5/8	12 5/8	11 1/2	-9.7	COMPUTER SYSTEMS						
D	AUTO SCIENCES	5-14	8 3/4	8 3/4	7 1/2	-13.5	N	SURROGUS CORP.	78-175	134 1/4	1 1/4	1 1/4	+0.6
D	BRANDON APPLIED SYS	1-9	1 1/2	1 1/2	1 1/2	+20.0	N	COLLINS RADIO	8-37	14 3/4	1 1/4	1 1/4	-1.7
D	COMPUTER ABE INDUS.	1-5	1 1/4	1 1/4	1 1/4	-0.0	N	CONTROL DATA CORP.	30-122	14 3/4	1 1/4	1 1/4	-2.7
D	COMPUTER ENVIOR.	3-24	2 1/2	2 1/2	2 1/2	0.0	D	DATA GENERAL CORP.	16-59	27	2 3/4	2 3/4	+11.3
D	COMPUTER INDUS.	2-10	4	4	3 1/2	-12.5	A	DIGITAL EQUIPMENT	50-124	60	1 1/2	1 1/2	+0.8
D	COMPUTER NETWORK	2-16	4	4	3 1/2	-12.5	N	ELECTRONIC ASSOC.	3-11	4 3/4	1 1/8	1 1/8	+2.7
D	COMPUTER PROPERTY	9-15	4	4	3 1/2	-12.5	A	ELECTRONIC ENGINEER.	3-14	4 1/2	3/8	3/8	-7.6
N	COMPUTER SCIENCES	6-34	10 1/8	10 1/8	9 1/4	-7.1	N	FORGOS	18-39	21 7/8	5/8	5/8	+1.7
D	COMPUTER USAGE	2-8	5 1/8	5 1/8	4 1/2	-11.9	D	GENERAL AUTOMATION	9-42	11 1/4	1 1/2	1 1/2	+11.1
A	COMPUTING & SOFTWARE	16-73	21 1/4	21 1/4	19 1/4	-9.4	N	GENERAL ELECTRIC	60-88	88 7/8	1 1/4	1 1/4	+1.1
D	COMSIS	2-10	2 1/4	2 1/4	1 1/4	-10.0	N	HILL-PACKARD CO	18-45	27	3/8	3/8	+1.4
D	CONSHARE	3-15	4 1/8	4 1/8	3 1/2	-11.9	N	HONEYWELL INC.	65-152	77	3/8	3/8	+0.4
D	CONSOL. ANAL. CENT.	1-5	1 1/4	1 1/4	1 1/4	0.0	N	IBM	225-387	292 5/8	5 7/8	5 7/8	-1.8
D	DATA AUTOMATION	1-24	5 1/8	5 1/8	4 1/4	-18.1	N	NCR	30-86	34 1/8	1 1/8	1 1/8	-5.1
D	DATA PACKAGING	5-29	6 1/2	6 1/2	5 1/2	-15.4	A	WANG LABS., INC.	18-33	31 1/2	7/8	7/8	-2.1
D	DATATION SERVICE	1-6	2 1/4	2 1/4	1 1/2	-36.4	N	RAYTHEON CO.	16-33	33 1/2	3/8	3/8	-1/3
D	DATASAT	4-8	1 1/4	1 1/4	1 1/4	0.0	N	SIC. CONTROL CORP.	10-40	27 1/4	1	1	-4.3
D	DIOITAL	1-5	1 1/4	1 1/4	1 1/4	-18.6	N	SPIRY RAMP	10-40	27 1/4	1	1	-4.3
D	EDP RESOURCES	5-15	4	4	3 1/2	-12.5	A	SYSTEMS ENG. LASS	10-49	16 7/8	1 1/8	1 1/8	-8.7
A	ELECT COMP PROD.	3-11	4 5/8	4 5/8	4 1/2	-9.1	N	VARIAN ASSOCIATES	40-19	13 1/4	1 1/8	1 1/8	-5.1
A	ELECTRONIC DATA SYS.	11-103	65 1/2	65 1/2	60 1/2	-7.7	N	XEROX CORP.	60-115	83 1/2	5 3/8	5 3/8	-5.8
D	INFORMATICS	1-5	6 1/2	6 1/2	5 1/2	-15.4	LEASING COMPANIES						
D	ITEL	4-26	17 1/2	17 1/2	16 1/2	-5.7	D	ROUTHIE COMPUTER	8-25	12 3/4	1 1/2	1 1/2	+4.0
D	LEVIN-TOWNSEND SERV.	1-13	2 1/4	2 1/4	2 1/4	0.0	D	GRESHAM CORP.	3-9	2 7/8	0	0	0.0
A	MANAGEMENT DATA	1-5	1 1/4	1 1/4	1 1/4	0.0	D	COMPUTER EXCHANGE	4-8	5	1 1/4	1 1/4	+4.7
D	MAT COMP ANALYSTS	1-5	1 1/4	1 1/4	1 1/4	0.0	A	COMPUTER INVESTING GRP	4-12	7 1/8	7/8	7/8	-10.0
D	MAT COMP. SERV.	1-5	1 1/4	1 1/4	1 1/4	0.0	D	COMPUTER LEASING	4-12	7 1/8	7/8	7/8	-10.0
N	PLANNING RESEARCH	13-30	17 1/2	17 1/2	16 1/2	-5.7	A	DATA PROC. F & O	4-12	7 1/8	7/8	7/8	-10.0
D	PROGRAMMING METHODS	2-9	2 1/4	2 1/4	2 1/4	0.0	D	OTRONIC RENTAL	10-24	20 1/4	1 1/4	1 1/4	+7.1
D	PROGRAMMING & SYS	1-35	1 1/4	1 1/4	1 1/4	0.0	D	OSCARSON COMPUTER	10-24	20 1/4	1 1/4	1 1/4	+7.1
D	PROGRAMMING SCIENCES	1-35	1 1/4	1 1/4	1 1/4	0.0	D	DIERLO COMP. LEAS.	10-24	20 1/4	1 1/4	1 1/4	+7.1
N	SCIENTIFIC RESOURCES	2-22	4 1/8	4 1/8	3 1/2	-21.9	A	OPRA, INC.	7-10	4 1/8	1 1/2	1 1/2	-10.8
D	SOFTWARE SYSTEMS	1-2	1 1/4	1 1/4	1 1/4	0.0	A	GRANDVIEW COMPUTER	7-10	4 1/8	1 1/2	1 1/2	-10.8
D	TSS COMPUTER CENT.	4-27	4 3/4	4 3/4	4 1/4	-5.5	N	LEASCO DATA PROC.	7-10	12 5/8	1 1/8	1 1/8	+1.0
D	UNITED DATA SYSTEMS	1-5	1 1/4	1 1/4	1 1/4	0.0	D	LECTRO COMP LEAS	2-9	2 3/4	0	0	0.0
N	UNIVERSITY COMPUTING	14-39	21 3/4	21 3/4	20 1/4	-5.8	A	LEVIN-TOWNSEND CHP	5-15	5 7/8	1 1/4	1 1/4	+1.0
A	URS SYSTEMS	9-21	8	8	7 1/2	-6.3	N	UNC DATA, INC.	3-8	5	1 1/2	1 1/2	0.0
D	U.S. TIME SHARING	3-14	2 7/8	2 7/8	2 1/4	-11.5	D	NCC INDUSTRIES	3-8	5	1 1/2	1 1/2	-8.3
PERIPHERALS & SUBSYSTEMS													
N	ADDRESSOGRAPH-MULT	21-63	23 1/8	23 1/8	21 1/2	-12.5	N	SYSTEMS CAPITAL	3-19	13 7/8	1 1/8	1 1/8	+0.9
D	ALPHAMINER	2-15	3 1/4	3 1/4	3 1/4	0.0	EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE						
N	AMPEX CORP.	13-18	16 1/4	16 1/4	15 1/4	-6.1	L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER						
D	ASTRODATA	3-14	3 1/4	3 1/4	3 1/4	0.0	B-T-C PRICES ARE BID PRICES AS OF 5 P.M. OR LATER BID						
D	ATLANTIC TECHNOLOGY	3-14	3 1/4	3 1/4	3 1/4	0.0	(1) TO NEAREST DOLLAR						
D	DOLBY, SERANEX & NEW	5-13	7	7	6 1/2	-7.1	Computer Stocks Trading Index						
N	BUNKER-RAMO	6-15	8 5/8	8 5/8	8 1/4	-5.3 Computer Systems Software & EDP Services						
A	CALCOMP	11-34	33 3/8	33 3/8	31 3/4	-6.0 Peripherals & Subsystems Leasing Companies						
D	COMINTECH	3-13	5 1/8	5 1/8	4 1/2	-11.9 Supplies & Accessories CW Composites Index						
D	COLORADO INSTRUMENTS	4-13	10 1/4	10 1/4	9 1/4	-9.4							
D	COMPUTER CONHUB	5-16	6 1/2	6 1/2	5 1/2	-15.4							
A	COMPUTER EQUIPMENT	4-12	4 1/4	4 1/4	4 1/4	0.0							
K	COMPUTEST	14-28	15	15	14 1/2	-3.3							
D	DATA PRODUCTS CORP.	4-23	3 1/4	3 1/4	3 1/4	0.0							
D	DATA TECHNOLOGY	4-23	3 1/4	3 1/4	3 1/4	0.0							
D	DIGITALONICS	7-10	4 1/8	4 1/8	4 1/8	0.0							
N	ELECTRONIC M & H	7-10	4 1/8	4 1/8	4 1/8	0.0							
D	FABRI-TEC	3-9	2 5/8	2 5/8	2 1/4	-9.1							
D	FARMINGTON HFO	7-17	2 1/4	2 1/4	2 1/4	0.0							
D	INFORMATION DISPLAYS	4-17	8 1/2	8 1/2	7 1/2	-11.9							
D	MANAGEMENT ASSIST	1-4	1 1/4	1 1/4	1 1/4	0.0							
D	MARSHALL INDUSTRIES	2-7	1 1/4	1 1/4	1 1/4	0.0							
A	MILRO ELECTRONICS	15-43	25 3/4	25 3/4	24 1/4	-5.0							
N	MONMOUTH DATA SCI	19-47	25 3/4	25 3/4	24 1/4	-5.0							
D	OPTICAL SCANNING	11-52	16 1/2	16 1/2	15 1/2	-6.1							
D	PHOTON	4-17	1 1/4	1 1/4	1 1/4	0.0							
D	PHOTO-MAGNETIC SYS.	1-9	3 1/4	3 1/4	3 1/4	0.0							
D	POTTER INSTRUMENT	15-32	16 1/4	16 1/4	15 1/4	-6.1							
D	PRECISION INST.	6-25	8 3/4	8 3/4	8 1/4	-2.4							
D	RECOGNITION EQUIP	13-35	18 1/4	18 1/4	17 1/4	-5.4							
D	RECORD CORP.	4-34	4 3/4	4 3/4	4 1/4	-9.1							
N	SANBORN ASSOCIATES	7-28	13 1/4	13 1/4	12 1/4	-7.5							
D	SCAN DATA	5-33	9 3/4	9 3/4	9 1/4	-2.6							
D	TALLY CORP.	10-25	12 1/2	12 1/2	11 1/2	-8.3							
N	TELES	10-25	12 1/2	12 1/2	11 1/2	-8.3							
D	VIATRON	2-31	3 7/8	3 7/8	3 1/4	-13.2							
SUPPLIES & ACCESSORIES													
N	ADAMS-MILLIS CORP.	8-15	1 1/4	1 1/4	1 1/4	0.0							
D	BALTHORE BUS FORMS	8-15	1 1/4	1 1/4	1 1/4	0.0							
D	BARRY MIGHT	8-15	1 1/4	1 1/4	1 1/4	0.0							
D	DATA DOCUMENTS	15-35	17 1/4	17 1/4	16 1/4	-5.7							
D	ENVIS BUS FORMS	18-38	18 1/2	18 1/2	17 1/2	-5.4							
D	GRAHAM MATHEMATICS	5-10	9 1/2	9 1/2	8 1/2	-10.8							
D	GRAPHIC CONTROLS	7-17	7 1/8	7 1/8	6 1/2	-12.5							
N	HENKES	18-148	82 3/4	82 3/4	77 1/2	-6.1							
D	3M COMPANY	71-14	1 1/4	1 1/4	1 1/4	0.0							
D	MOORE BUS FORMS	27-38	38 1/2	38 1/2	37 1/2	-2.6							
N	NADELL CORP.	18-38	18 1/2	18 1/2	17 1/2	-5.4							
D	PHOTOLABS & RETNOLD	25-48	38 1/2	38 1/2	37 1/2	-2.6							

110
100
90
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70
60
50
40
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10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200

JUNE JULY AUG SEPT OCT NOV

BASE FOR EACH TRADING INDEX: 100 as of 3/7/70

Earnings Reports

LMC DATA INC.
Six Months Ended August 31
1970
Revenue \$1,577,469 \$1,937,477
Loss 269,213 158,516
Not released to reflect year-end
equipment writeoffs.

WANG LABORATORIES INC.
Three Months Ended

Announcing Autoflow's Fifth First.

First First: 1966

The first software product listed on the General Services Administration (GSA) schedule.

Second First: 1967

The first software product selected by Industrial Research Magazine as one of the 100 most significant technical products of 1967.

Third First: 1968

The first software product with over 500 installations.

Fourth First: 1969

The first software product with over 1000 installations.

And now the Fifth First: 1970

Autoflow is the first software product to be granted a United States Patent, (issued October 6, 1970, Patent No. 3,533,086.)

Autoflow has proven itself in over 1400 installations, in virtually every type of system. Large, small or anywhere in between.

If you couldn't justify Autoflow before... look again. Because while we're getting our "firsts" we were also building in additions to help in debugging and maintenance. Like three new listings for 360 assembly users (EQU, Macro Usage and Modified Tag Summaries). And new features for 360 COBOL users.

And to help in conversion and maintenance of second generation programs we've just released our 360 system that processes 1400 series Autocoder and SPS and our 7070 and 7080 Autocoder Autoflow Language Processors.

That's in addition to our 14 input languages and 12 output listings.

In all, the 1970 Autoflow is three times more comprehensive than the original. And we're constantly working on newer features.

Call any ADR office for a demonstration. We'll be glad to share our "firsts" with you.



APPLIED DATA RESEARCH THE SOFTWARE BUILDERS

CREATORS OF AUTOFLOW, META COBOL, LIBRARIAN,
SAM, ROSCOE, IAM, STAR AND PI SORT.

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